FOOD ENGINEERING

April 1952

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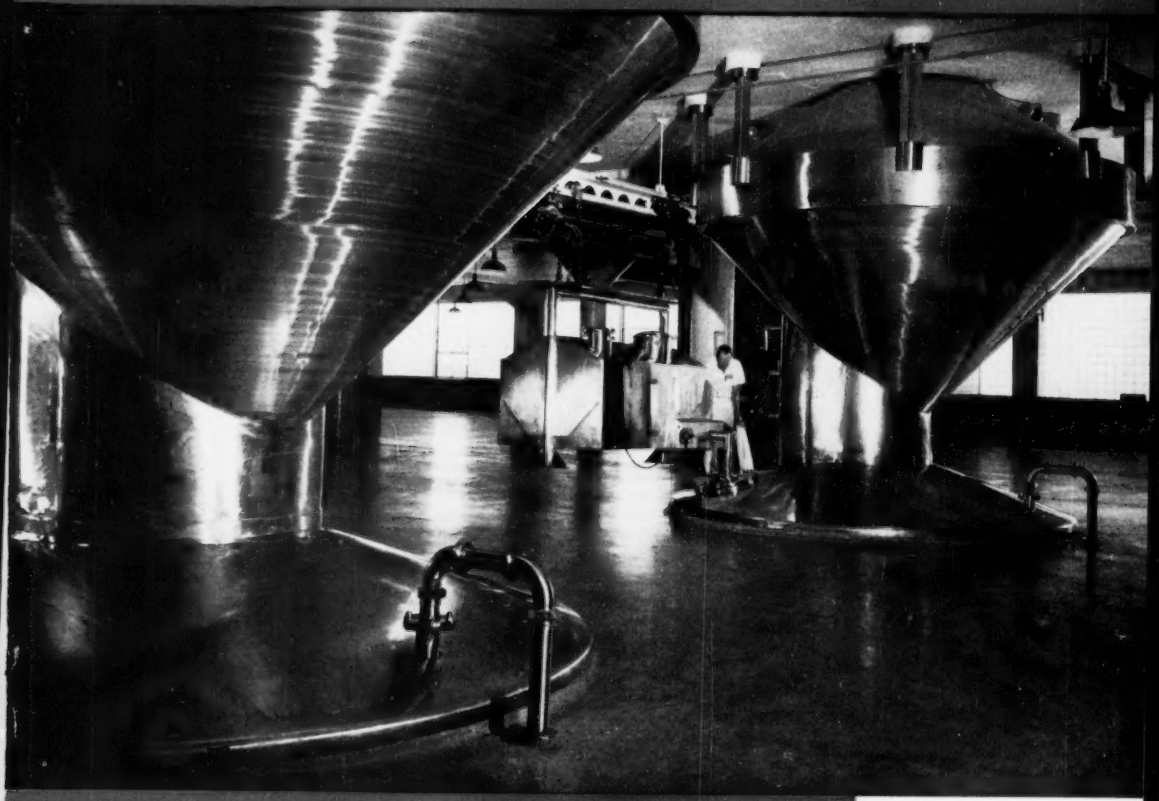

HUGE stainless hoppers feed sugar directly to syrup-mixing tanks in Dr. Pepper's streamlined operation. (P. 96)

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Card Inside Back Cover

PUTTING IT ON THE LINE...

in Industry after Industry!

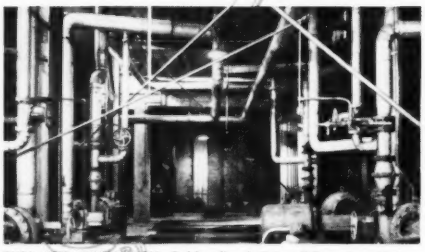
The Grinnell-Saunders Diaphragm Valve . . . . . .

Here's why . . . Piping in today's complex industrial plants is an exacting science involving the handling of highly corrosive fluids, gases, compressed air, beverages, foods and suspended solids . . . in lines where corrosion, abrasion, contamination, clogging, leakage and maintenance are costly factors. Under such conditions, the amazing adaptability of the Grinnell-Saunders Diaphragm Valve explains its acceptance by industry after industry.

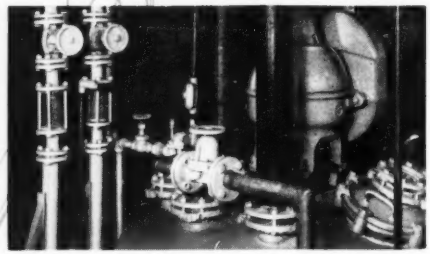
Bodies of this versatile valve are made in a variety of metals — iron, stainless steel, bronze, aluminum and others. *But of more importance* is the fact that a body of cast iron (a metal not in short supply) can be lined with glass, lead, natural rubber, neoprene and other materials which, in many instances, handle corrosive fluids *better* than metals.

Diaphragms come in natural rubber, neoprene, butyl, hycar, a special synthetic for foods, and **KEL-F**. This last is chemically inert to all acids and alkalies in all concentrations with the exception of molten alkali metals.

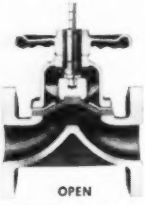
From this broad selection of materials, the problems which the Grinnell-Saunders valve can solve are extremely varied. No wonder industry after industry is putting it on the line.



PULP AND PAPER MILL. Rubber-lined Grinnell-Saunders Valves on stainless steel piping handle sulphate pulp stock in bleach plant of Potlatch Forests, Inc., Lewiston, Idaho.

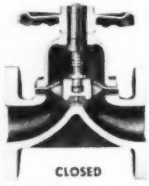


CHEMICAL PLANTS. Glass-lined Grinnell-Saunders Diaphragm Valves, with KEL-F diaphragms, handle chlorinated organic chemicals at Hooker Electrochemical Company, Niagara Falls, N. Y.



OPEN

Showing rising spindle . . . valves are available with rising or stationary spindle.

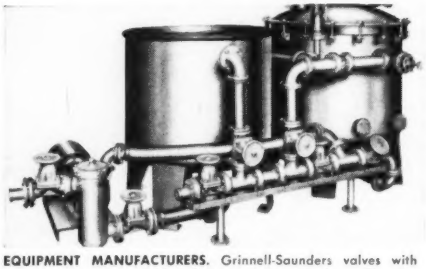


CLOSED

KEL-F diaphragm, using special rubber backing cushion and floating tube nut design.

CHECK THESE GRINNELL-SAUNDERS FEATURES...

- Diaphragm absolutely isolates working parts from the fluid.
- Diaphragm lifts high for streamline flow in either direction.
- Diaphragm presses tight for positive closure.
- Body, lining and diaphragm materials to suit service.
- Simple maintenance — diaphragm easily replaced.



EQUIPMENT MANUFACTURERS. Grinnell-Saunders valves with rubber linings are standard on filtration equipment for solution clarification, made by Industrial Filter & Pump Mfg. Co., Chicago, Ill.

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Food Engineering

ABC Vol. 24 • APRIL, 1952 • No. 4 ABP

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FOOD ENGINEERING
(Formerly Food Industries)
April, 1952 Vol. 24, No. 4

Member ABC and ABP

Published Monthly by McGraw-Hill Publishing Company, Inc., James H. McGraw (1860-1948), Founder. **Publication Office 99-129 N. Broadway, Albany 1, N. Y.**

Executive, Editorial and Advertising Offices: McGraw-Hill Building, 330 W. 42nd St., New York 36, N. Y. Curtis W. McGraw, President; Willard Chevalier, Executive Vice-President; Joseph A. Gerardi, Vice-President & Treasurer; John J. Cooke, Secretary; Paul Montgomery, Senior Vice-President, Publications Div.; Ralph B. Smith, Editorial Director; Nelson Bond, Vice-President & Director of Advertising; J. E. Blackburn, Jr., Vice-President & Director of Circulation.

Subscriptions: Address correspondence to Food Engineering — Subscription Service, 330 W. 42nd St., New York 36, N. Y. Allow ten days for change of address.

Subscriptions are solicited only from the executives, engineers, and technologists in food processing plants. Position and company connection must be indicated on subscription orders.

Single copies 35c. Subscription rates—U. S. and possessions $2 for 1 yr., $3 for 2 yr., $4 for 3 yr. Canada, $3 for 1 yr., $4 for 2 yr., $5 for 3 yr. Other Western Hemisphere countries $10 for 1 yr., $16 for 2 yr., $20 for 3 yr. All other countries, $15 for 1 yr., $25 for 2 yr., $30 for 3 yr. Entered as 2nd class matter Aug. 26, 1948, at Post Office at Albany, N. Y. under Act of Mar. 3 1879. Printed in U.S.A. Copyright 1952 by McGraw-Hill Publishing Co., Inc.—All Rights Reserved.

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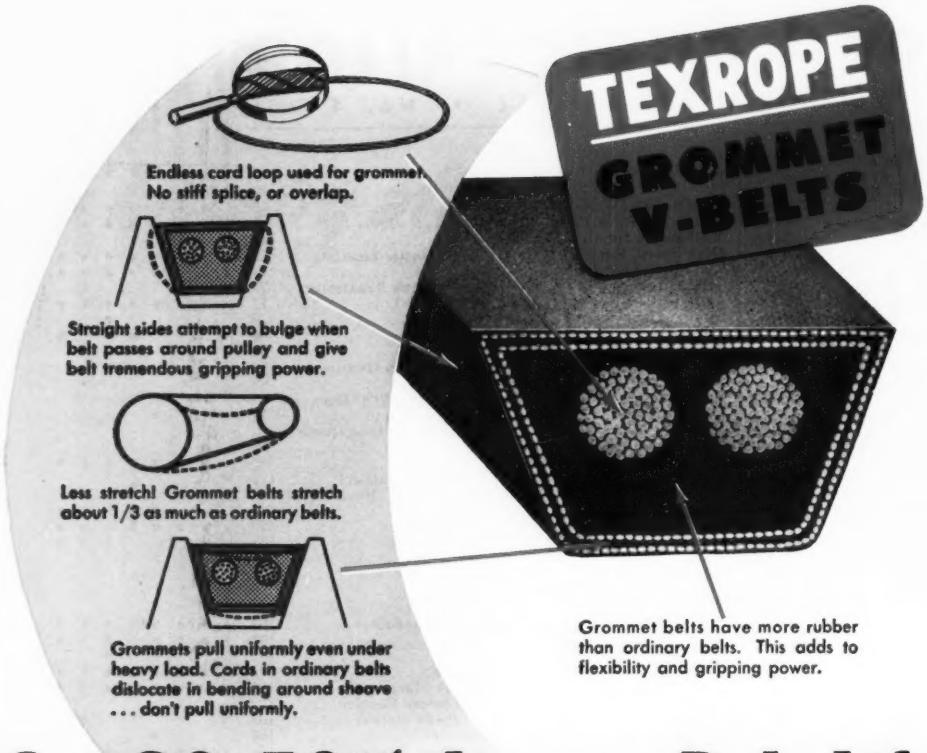

TEXROPE
GROMMET
V-BELTS
Endless cord loop used for grommet. No stiff splice, or overlap.
Straight sides attempt to bulge when belt passes around pulley and give belt tremendous gripping power.
Less stretch! Grommet belts stretch about 1/3 as much as ordinary belts.
Grommets pull uniformly even under heavy load. Cords in ordinary belts dislocate in bending around sheave . . . don't pull uniformly.
Grommet belts have more rubber than ordinary belts. This adds to flexibility and gripping power.

Get 20-50% Longer Belt Life!

Texrope Grommet belts cost same as ordinary belts yet last longer, grip better!

YOU SAVE with long lasting *Texrope* grommet belts. Production costs are low because machines keep running with few interruptions. Maintenance costs are low because grommet belts have little stretch, need little attention.

Patented grommet belts last 20 to 50% longer than ordinary belts, depending on the service. The more severe the service, the greater the increase over ordinary belts. The reason? There is no overlapping cord section as in all ordinary belts. Most belt failures occur in sections where cords overlap. A grommet is like a giant cable except that it's endless — a cord built up by winding heavy cord on itself.

More Gripping Power

In addition, *Texrope* grommet belts have more rubber in relation to belt size than ordinary belts. Without that stiff overlap, they're more flexible, grip pulleys better. Size for size, grommet belts give 1/3 more gripping power, pull heavier loads with higher safety factor. Less slip means less surface wear too.

Jointly Developed

Grommet belts are made in C, D and E sections, and cost no more than ordinary belts. They were developed as a result of cooperative research of Allis-Chalmers and *The B. F. Goodrich Company.*

Call your nearby Allis-Chalmers distributor or district office when you need V-belts and specify long life *Texrope* grommet V-belts, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

A-3634

Texrope, Magic-Grip, and Vari-Pitch are Allis-Chalmers trademarks.

ALLIS-CHALMERS

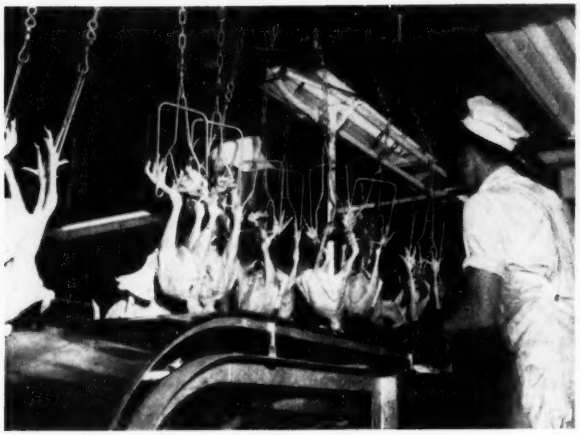
ORIGINATOR OF THE MULTIPLE V-BELT DRIVE

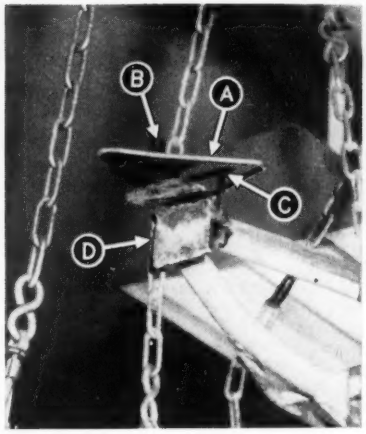
Everything in V-Belt Drives

In addition to V-belts, Allis-Chalmers can furnish all your drive needs including: *Magic-Grip* sheaves — the fastest mounting sheave you can buy; and *Vari-Pitch* sheaves for changing speeds. These are made for standard and wide range belts, in two types: Stationary control — for changing speeds when the machine is not running. Motion control — for changing speeds while the machine is in motion. In addition, A-C makes Speed Changers up to 75 horsepower.

You'll like Allis-Chalmers engineering too, for A-C has installed more industrial V-belt drives than any other company.

PRACTICAL IDEAS





Device Divides Poultry Conveyor

Economy of floor space and improved use of equipment for eviscerating poultry has been made possible in our plant by use of a conveyor separator built from angle iron, pipe and steel rods.

Plucked chickens approach the eviscerating station in single file, suspended by chains from an overhead endless conveyor. To transfer them to two auxiliary lines over each of the two eviscerating-pan conveyors, and then return them to the original line after inspection, obviously required excessive labor. However, floor space being a consideration, the double eviscerating line was called for.

By means of our home-made separator or line divider (see left photo), each of the two pan conveyors is now supplied with dressed fowl without the need of a tedious transfer operation.

Here is how the divider is constructed and how it functions:

A steel rod shaped in the form of an equilateral triangle—(A) in right photo—moves about a pivot (B), located near the angle which points to the oncoming chains. As one of the latter slides along one side of the triangular rod to the after-end, the pressure of the chain swings the triangle on its pivot so that the opposite side is in the path of the next chain, which will therefore be diverted to that side.

To prevent the triangular assembly from swinging too far, the stop rod (C), mounted on the angle-iron assembly support (D), was added.

Angle iron (D), carrying the divider assembly, is attached to a guide frame made of welded pipe, which spreads the divided lines far enough apart so that the suspended fowl travel above the two lines of eviscerating pans. The divider also elevates the birds conveniently above the pan conveyors for efficient inspection.—*Stokes Homan, Poultry Technologist, Armour and Company, Salisbury, Md.*

Handy Stand for Sanitary Pump

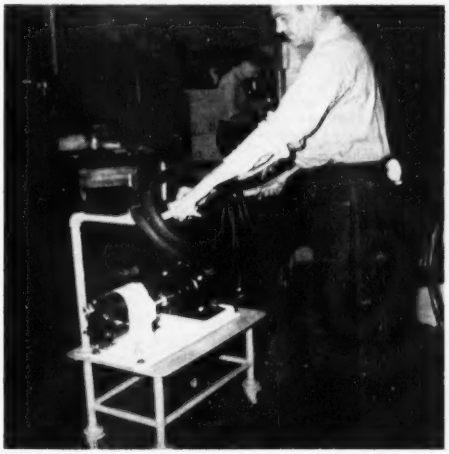
Simply fabricated in our plant, at negligible cost, from pipe fittings and sheet iron, this sanitary-pump mounting has proved very efficient.

An advantageous feature is the location of the steel sheet on which the pump is mounted. Set at an elevation of about 16 in. above floor level, it is at a convenient height for hooking-up the pump, and also for cleaning after use.

Also noteworthy is the pipe frame (see photo) which is extended, with ample clearance, up and over the pump base to form handles with which to maneuver the carriage.

Handle-frame above the pump serves another useful purpose: It provides a rack on which hose and electric cord can be wound and stored for easy transportation with the pump.

Making the pump mobile, of course, permits employing it at several locations, thus reducing the number of pumps required.—*D. B. Bradshaw, Plant Engineer, A. H. Johnson Co., Boston.*



No ONE chain serves every purpose

LINK-BELT offers the right chain

. . . engineered for your requirements

Don't settle for a "cure-all" chain to handle every job. Different types of chain have different characteristics. That's why Link-Belt makes a complete line of chains. Our engineers can recommend the correct type of chain to fit your particular needs . . . the one that does your job best.

Equally important is your assurance that *any* chain with the Link-Belt name will give you longer chain life. Accurate control of raw materials and processes . . . plus manufacturing refinements add up to the highest standards.

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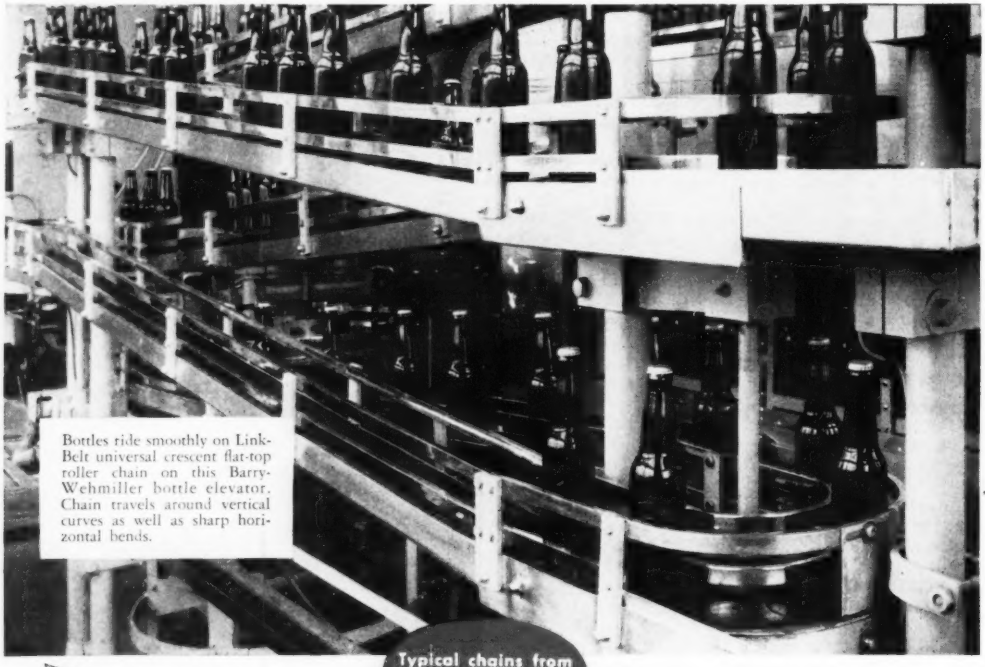
LINK-BELT

CHAINS AND SPROCKETS



Bottles ride smoothly on Link-Belt universal crescent flat-top roller chain on this Barry-Wehmiller bottle elevator. Chain travels around vertical curves as well as sharp horizontal bends.

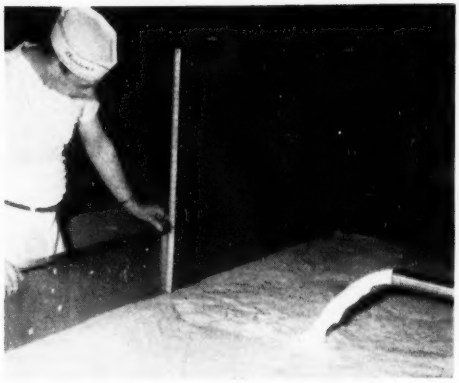
Typical chains from the complete LINK-BELT line

S-815 flat top conveyor chain—economical, sturdy, reliable, easy to detach and to keep clean.

Class RC crescent flat top chain—travels in horizontal planes, around corners; ideal for bottles and cans.

Class 400 pintle chain—cast links with closed pin joint, for light conveyor, elevator or drive duty.

Class 400 swivel chain—carries cartons, cases, etc. over paths with both vertical and horizontal turns.



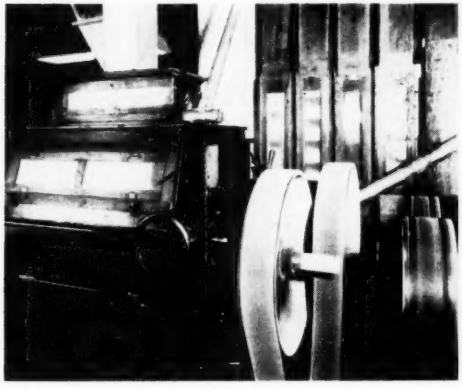
Square-and-Rule as Tank Gage

A machinist's square with steel yardstick attachment has proved handy for gaging volume of fill in a 15,000-gal. cheese vat.

It is on the frequent occasions when we process less than a full charge of the vat that a means of measuring the vat's contents is required.

When the square-and-yardstick gage was adopted, it was necessary to calibrate the steel rule. This was easily accomplished by filling the vat, using a water meter, and calibrating the stick accordingly.

This type gage has two applications: Not only can it be used to measure the charge, but also the amount of whey withdrawn.—*W. A. Sommer, Production Manager, Midwest Area, Special Products Div., The Borden Co., Elgin, Ill.*



Plastic Cuts Inspection Costs

By replacing the inspection panels on its machines with sheets of plastic, a large Salt Lake City flour milling company has reduced production charges and maintenance costs several thousand dollars annually.

The company's mills had been troubled by loss of production due to breakage of the glass inspection panels on purifiers, elevators, rollers, and other milling machinery. To check particle size and flow rate within the machines, it was standard practice for workmen to tap the inspection panes with blocks of wood in order to dislodge flour clinging to the inside surfaces. Whenever glass windows broke under this treatment it was necessary to stop production and discard any flour which might have been contaminated by glass particles.

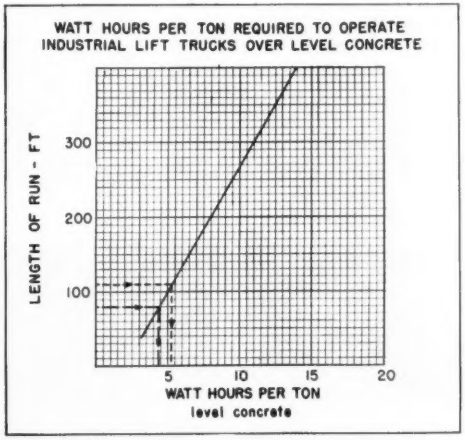
But since installation (left in photo) of transparent acrylic plastic panels—which have excellent clarity and can withstand impact many times that required to break glass of equal thickness—the costly hazard is ended.

Company executives estimate that several hundred barrels of flour were saved during the first three months after the new panels were put in.

The same plastic has also now replaced the old wooden inspection panels on the vertical elevator tubes (right in photo) that conduct flour from one floor level to another.

The wooden panels had to be removed for inspection, permitting a large amount of flour dust to escape and thereby aggravating the general housekeeping problem. The transparent acrylic plastic panels eliminate the necessity of opening the elevator tubes, except for repairs, thus cutting to a minimum the problem of flour dust.

One of the company's plants also uses the acrylic sheet for windows in doors and for regular window glazing, where there had been excessive glass breakage due to vandalism.



Picking Proper Power-Truck Batteries

Selection of under-capacity power-truck batteries is faulty, while over-capacity ones are unwarranted on the score of initial cost.

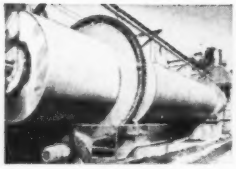
So base your next battery order on a calculation of daily watt-hour needs—and thus get the best dollar-for-dollar performance.

Let's assume a typical case—a 3,650-lb. truck, 2,000-lb. load, 3-ft. average lift, 110-ft. average haul, and a 30-ft. 10-percent grade to be traversed.

Figures needed are watt-hours to run the average haul loaded, climb the grade, traverse the haul distance empty (grade deducted), lift the load for stacking, and tilt the mast for load-centering.

Our graph shows (dotted lines) that 5.4 watt-hours are required to haul 1 ton along the 110-ft. haul of our example. Weight of truck and load total 5,650 lb., or 2,825 tons. Multiplying latter by 5.4 w.-hr. gives 15.25 w.-hr. for the level run.

Next, additional watt-hours for the up-grade: Watt-hours equal tons (truck plus load) x feet (length of grade)



Louisville Rotary Cooler with rotary shell and external water sprays.

Louisville Rotary Steam-Tube Dryer —indirect type using steam as heating medium, and utilizing 85% of that steam for useful work.

There is a LOUISVILLE DRYER for better drying in the following industries: Brewing • Canners By-Products Chemical • Distilling • Fertilizer • Fisheries • Feeds • Foods Mining • Packing House Products • Wood Products

PROCESS EQUIPMENT DIVISION GENERAL AMERICAN TRADE MARK

LOUISVILLE DRYING MACHINERY UNIT

GENERAL AMERICAN TRANSPORTATION CORPORATION

General Offices: 135 South LaSalle Street, Chicago 90, Illinois

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Know the results before you buy!

A Louisville engineer can tell you every saving, every improvement, every bit of increased efficiency *before* you invest. A Louisville Dryer is fitted to your job. It's the result of a Louisville engineer's complete analysis of your particular problem, of *knowing* your problem thoroughly . . . and solving it by applying 50 years of drying experience, and using the testing facilities of General American's laboratories.

More than once, a Louisville Dryer has turned a losing operation into a profitable one. Write or call for a Louisville engineer to make an obligation-free survey of your operation.

x grade (percent) x .013 (a constant). Result: 2.825 tons x 30-ft. x .10 x .013 equals .11 w.-hr., the extra power needed for climbing.

To calculate watt-hours for the empty return trip, deducting the grade, include the 110-ft. total return distance, less the 30-ft. upgrade, or 80-ft. Now, turn to the graph again for watt-hours per ton on the return trip. Answer: 4.4 w.-hr. Since the weight is now 1.825 tons, multiply 4.4 w.-hr. by this figure to obtain 8.03 w.-hr.

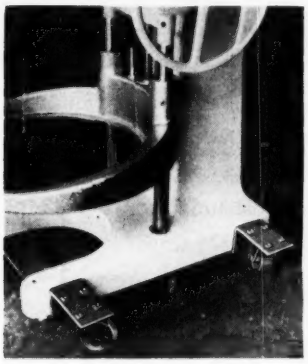
Lifting requirements: Watt-hours per lift equals tons of load x feet of lift x 2 (a constant). Thus, 1 ton x 3 ft. x 2 equals 6 w.-hr. to lift the load. For unstacking: Watt-hours per lift empty equals ½ load capacity in tons x feet of lift x 2.

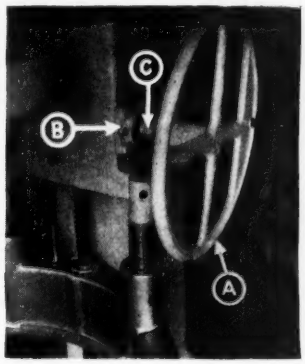
Even though small, energy to tilt the mast should be included: Watt-hours per tilt loaded, equals tons of load x 1 (a constant). Thus, 1 ton x 1 equals 1 watt-hour per tilt loaded (watt-hours per tilt empty equal ½ load capacity x 1).

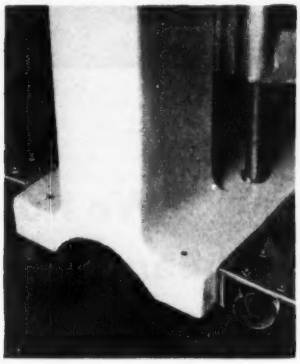
To summarize: Run with load, no grade 15.25 w.-h.; extra power for grade .11; run empty, grade deducted 8.03; power required per lift 6.00; and power required per tilt 1.00 total 30.39 w.-h. per trip.

At 250 trips per day, total is 7,597 w.-h. of battery power. If a 32v. battery is chosen for this truck, it must have approximately 237 amp.-hr. capacity (amp.-hr. equal w.-hr. divided by volts, hence amp.-hr. required equal 7,597 w.-hr. divided by 32v., or 237 amp.-hr.). Ampere-hour capacities are given in battery catalogs.

By this advance computing, buyer can economize.







Three Improvements in Mixer Operation

Changes made in an eastern plant have eased the handling of mixing machines, smoothed their performance, and also solved a sanitation problem. Improvements were easily accomplished at nominal cost in the plant shop.

Simplified Shifting of Units

There was a line of eleven beater-type mixers preparing batter for proofing into dough, with a twelfth as a spare which goes in every two weeks as a replacement for the one longest in service. Latter is pulled out for painting, repairing, and overhauling.

Mixers are heavy. And tilting such weighty machines so that ordinary dollies can be placed under the bases is not only a difficult task, but one frequently threatening disaster to both equipment and workers. This plant found transporting to the repair shop equally hazardous.

But today, loading is easy and transportation safe, since special caster equipped trucks were fabricated. The units have several advantages:

1. Trucks (first photo) are underslung, with minimum necessary floor clearance. Only slight tilting of a mixer is needed to slide supports under the base.

2. Casters are located outside mixer base instead of beneath. Not only does this caster location facilitate loading but also, because of increased equilibrium, stabilizes transportation.

3. Two trucks, each with its own wheels, now replaces the four-wheel vehicle. This simplifies loading and unloading. Formerly, a mixer had to be tilted at a considerable angle to permit a four-wheel dolly to slide under the base, or else it had to be jacked up at front or rear, or both. Now, one of the two-wheel trucks can be placed under the front end, and the second one under the opposite end with very little tilting.

Built of heavy strap metal, the underslung units are not only convenient and safe, but should last indefinitely.

Sealed Ball Bearings Work Better

Mixers came equipped with sleeve bearings fitted on the shaft driving the worm that raises and lowers the mixer-bowl support. But manual effort necessary had increased with bearing wear, requiring bearing replacement. Also, need for lubrication was frequent.

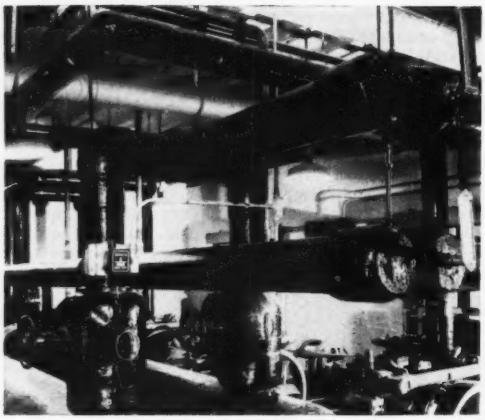
By replacing sleeve bearings with sealed ball bearings, control of the mixer-bowl support was improved.

Placement of ball-bearing housings was simplified by the following method: The hand wheel—(A) in second photo—was removed then sealed ball bearing (B) was slipped over shaft (C) and brought flush with the housing. In this position, bolt-hole centers were located. When drilled, holes were in correct position for true alignment of shaft.

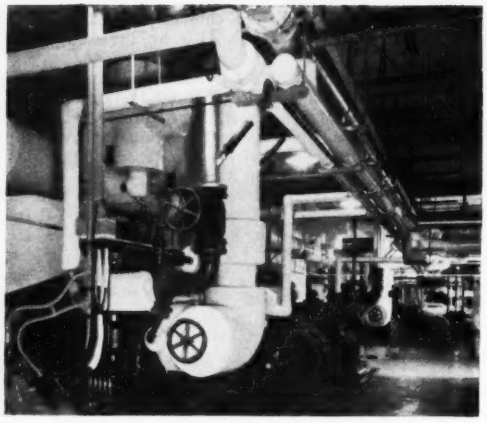
Cut-Out Base Aids Floor Cleaning

Front prongs of each mixer base under the bowl support are equipped with a means of leveling. Slight elevation of the prongs permitted washing under the front of the base. However, the rear of the base rested on the floor, barring adequate hosing of the area underneath.

This obstacle was overcome by cutting out a section of the base (third photo) with a torch. With this means of entrance from the rear, it is now possible to hose thoroughly, underneath the whole base, thus avoiding accumulation of refuse. Fact that these mixers have continued in use for years is proof that removing part of the base did not weaken them unduly.—*FE Staff.*



Cold line painted with Cork Covering Paint has neat, shiny black finish.



Sewed canvas provides de luxe finish and can be painted any desired color.

We have been asked . . .

"What's the best finish for cork insulated cold lines?"

A letter we recently received from a hotel engineer presented the following problem: "We are running some refrigeration lines in connection with the air conditioning of our dining rooms and wonder what would be the best finish for the cork covering on these lines."

Here's how we answered him: The proper finish for cork covering should be determined by two things—the conditions surrounding the lines and the desired appearance of the installation.

Where piping runs through dry rooms, the recommended finish for most installations is Armstrong's Cork Covering Paint. This brushed-on asphaltic paint provides a neat, shiny black finish for the line and also reinforces the vapor resistance of the factory-applied asphalt mastic finish on the cork covering.

For areas where a de luxe appearance is desired, the canvas finish is recommended. So that the finished job will be neat and smooth, a layer of rosin-sized paper is wrapped around the covering before 8-oz. canvas is neatly pasted or sewn in place. After the canvas is in place, it can be sized and then painted in any desired color.

Where piping runs through wet or humid atmospheres, refrigerated rooms, pipe shafts, or outdoors, roofing paper should be wired on straight pipe runs and painted with Armstrong's Cork Covering Paint. On fitting covers, Armstrong's Insulmastic, a weatherproof asphaltic compound, should be troweled on over hexagonal wire mesh.

In addition to these finishes, Armstrong can furnish special solvent-proof and fire-resistant finishes for cork pipe covering.

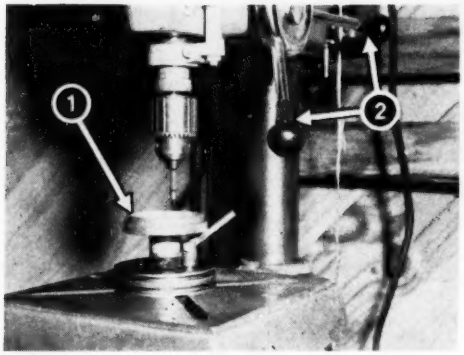
When you have any question about the selection or finishing of cold line insulation, consult the Armstrong engineer. He can furnish sound, practical advice on any insulation problem. The complete contracting organization he represents is equipped to handle any insulation job—offering qualified engineering aid, top-grade materials, and skilled application.

SEND US YOUR QUESTIONS: If you have any questions on the use or application of either high- or low-temperature insulation, please do not hesitate to write to us. We'll do our best to give you a prompt and practical answer. Just address a letter or post card to Armstrong Cork Company, 2304 Concord Street, Lancaster, Pennsylvania.

ARMSTRONG'S INDUSTRIAL INSULATIONS

MATERIALS - INSTALLATION

FOR ALL TEMPERATURES FROM 300°F. BELOW ZERO TO 2800°F.

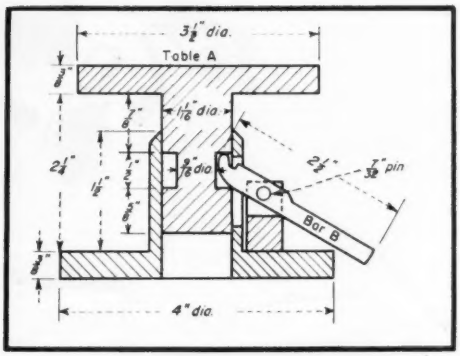


Jig Saves on Drills

Since constructing a special drill press jig—(1) in photo—we are able to bore innumerable holes without drill breakage.

Furthermore, the jig will drill the hole with greater accuracy.

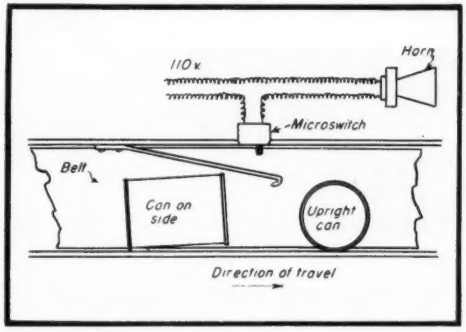
Formerly, such breakage was excessive. Drilling was accomplished by pressure on the levels (2) which lowered the drill. Too often the hand pressure applied was unavoidably irregular or too great, causing drills to break. Lost time and costly drill replacement justified constructing the adapter or jig (see drawing).



The metal to be drilled is placed on table (A), which can be rotated on its shaft to aid alignment with the drill.

Fitted into a circular recess in the shaft of table (A) is one end of the pivoted bar (B). The pressure of one finger on this bar is sufficient to raise the metal on the table against the drill, which is now maintained at a fixed level. With this arrangement the amount of pressure against the drill is readily controlled, so that drill breakage is rare.

This type of adapter will reduce drill breakage on any size or type press and at the same time speed operations. —*W. L. Chamberlain, Savannah, Ga.*



Device Detects Over-Turned Cans

No longer is our operation held up by a toppled can jamming the chain conveyor that transports finished product from the can cooler to the warehouse. A hook-end bar bolted to the angle-iron side of the conveyor now detects cans over-turned in the cooler, halting their travel until they are righted.

Operation is by a microswitch. The circuit is closed whenever the hook-end bar contacts a fallen can. Then a horn sounds an alarm and a near-by machine operator turns the can back on end.

Cans travel through the cooling tank on a 48-in. wire-mesh belt, and they exit onto an inclined 4-in. belt that makes the transfer to the warehouse chain conveyor. It is along the travel of the 4-in. belt that the hook detector is located.

The smooth rounded side surfaces of upright cans (see sketch) slightly depress the "snag-bar," but offer no lip to engage the hook. However, the crimp of an over-turned can does engage it. Force of the conveyor belt then drives the bar against the microswitch, thus closing the circuit which sounds the horn.—*R. A. Riley, Florida Fruit Canners, Frostproof, Fla.*

$50 EXTRA FOR BEST ITEM

You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month you will get an additional payment of $50.

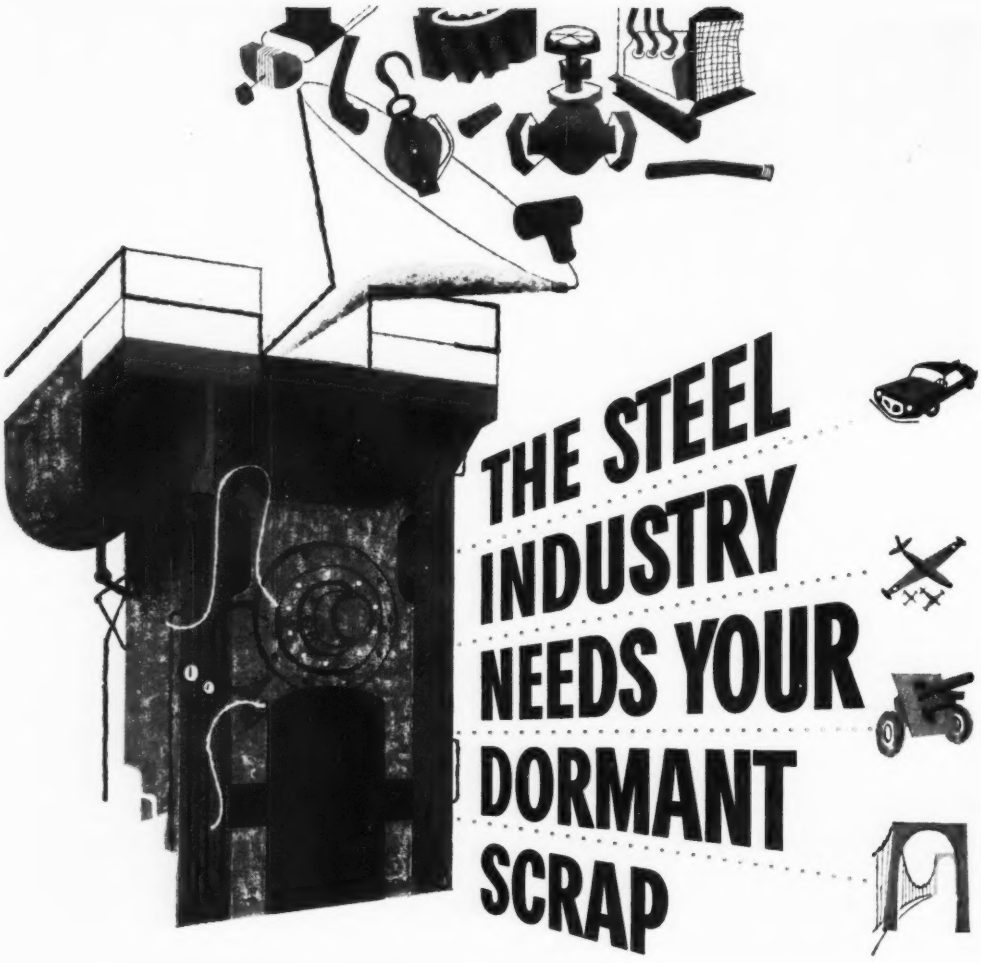
Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).

Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.

You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.

Send your items to: Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

FEBRUARY PRACTICAL IDEA voted best was "In-Transit Cooling Saves Space," submitted by R. J. Boddington, Plant Mgr., Wood & Selick, Sweetened Coconut Co., Inc., New York City. It told how roasted coconut temperature was lowered 100 deg. F. by air drawn through compact conveyor cooler during a 10-ft. travel.



THE STEEL INDUSTRY NEEDS YOUR DORMANT SCRAP

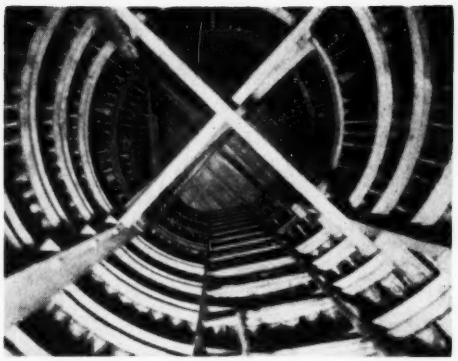
Steel scrap is needed right now. Without it the steel industry can't produce the steels needed for *your* requirements. *This is an emergency call. Dig up your dormant scrap.*

LOOK FOR OBSOLETE, DORMANT MACHINERY, TOOLS, JIGS, DIES, FIXTURES, OR ANY OTHER METAL EQUIPMENT, WHICH YOU NO LONGER NEED.

CRUCIBLE first name in special purpose steels

52 years of Fine steelmaking

CRUCIBLE STEEL COMPANY OF AMERICA GENERAL SALES AND OPERATING OFFICES, OLIVER BUILDING PITTSBURGH, PA.



Duo-Spirals Feed Single Conveyor

After we hinged a short length of roller conveyor to one of two spiral conveyors, we were able to select the cases discharged from each in the order desired.

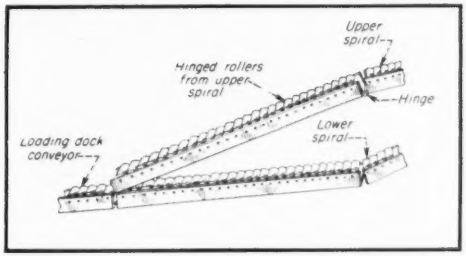
Here, in detail, was our problem: All frozen products from our several plants are stored in one refrigerated warehouse, from which mixed shipments are loaded onto refrigerated trailers for transfer to distributors.

Storage is on the building's two upper floors, from each of which orders are lowered to the shipping dock by two spiral roller conveyors (photo).

The second floor conveyor circles between the turns of the conveyor from the third floor. Accordingly, there was a two-level discharge onto a single loading dock conveyor.

The situation was further complicated when, say, 20 cases of frozen lima beans from the third floor were to be stacked in the front of a trailer, followed by 40 cases of peas on the conveyor from the second floor. If the cases were mixed on the loading dock conveyor, chances of error in segregating the orders were too great.

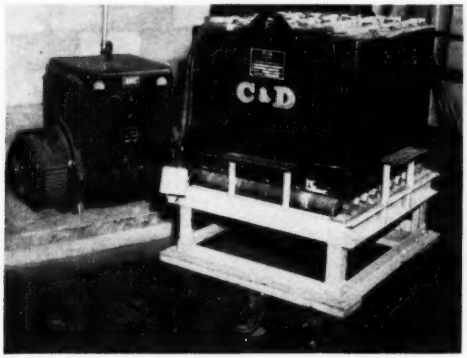
This is how we worked out the difficulties: Where the lower of the two spirals ends (see sketch), a straight length of rollers was added to connect with the dock rollers. To



the upper conveyor where the spiraling ends, the straight length of rollers was hinged, so as to drop down onto the conveyor feeding the trucks.

Now, by an arrangement of stops, the 20 cases from the third floor can exit onto the dock feed rollers. And any following cases are delayed while the 40 cases roll down the hinged conveyor section from the upper spiral.

When this procedure was adopted, loading speed was increased and shipping errors minimized; what's more, shortening of the loading period reduced the time during which frozen products were exposed to higher temperatures.—*J. J. Whittington, Plant Manager, John H. Dulany & Son, Inc., Exmore, Va.*



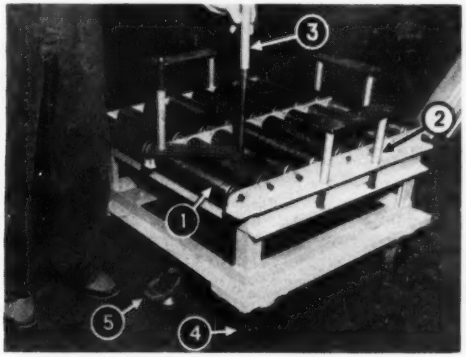
Practical Battery-Handling Truck

Home-made at nominal cost from spare parts, our special battery truck not only speeds the transfer and handling of batteries for charging, but also protects them.

This truck (left photo) is sturdily constructed of angle iron and channels, and it has four noteworthy features:

1. Transfer of a battery from fork-truck to handling truck is easy because the top, or bed, of the mobile transfer unit is built to the same height as the battery platform of the fork-truck. And in particular this top is made of sections of roller conveyor—(1) in right photo—on which the heavy batteries readily roll into place.

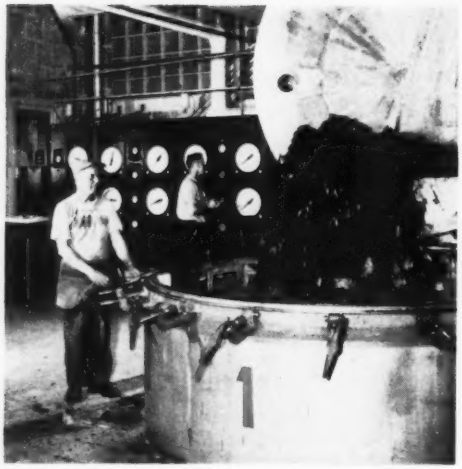
2. Simply constructed safety rails—see (2)—prevent the battery from rolling or shifting once it is positioned



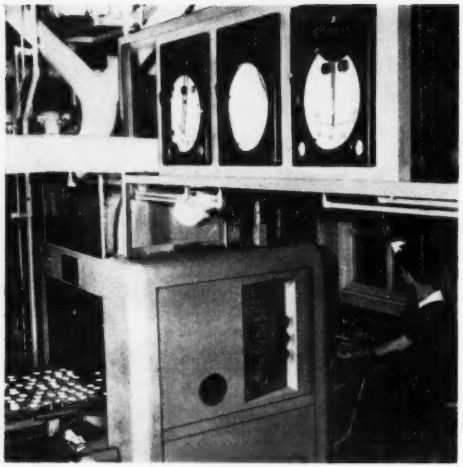
on the handling unit. These attachments, made of rods projecting at right angles from iron straps, fit snugly against the battery. Easily placed or removed, the tapered-end rods pass through holes drilled in the top of channel iron sides and anchor in similar holes in the bottom side of the channel. Sleeves made of pipe (3) hold the braces at the required height.

3. Though the transfer truck is of heavy construction and carries a much heavier battery, the assembly requires little effort to push and maneuver because it is fitted with solid-rubber, ball-bearing casters (4).

4. Attached to the under side of the base of the carriage is a foot operated floor clamp (5) which, when lowered, immobilizes the assembly.—*D. B. Bradshaw, Plant Engineer, A. H. Johnson Co., Boston.*



EXACT COLOR MATCHING *is important to quality carpet manufacturing . . . and depends, in part, upon the rigid maintenance of proper time and temperature schedules in the raw stock dye kettles. These* **ElectroniK** *controllers keep the schedules uniform and reproducible.*

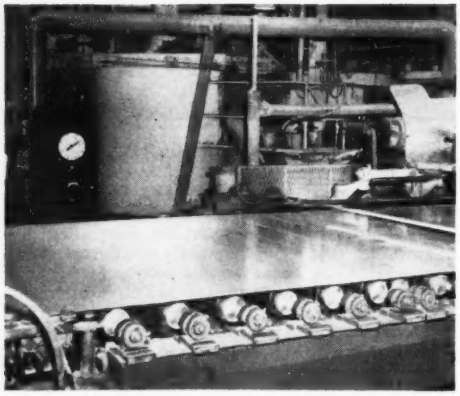


AUTOMATIC ENROBER CONTROL *system keeps the temperature of chocolate at precisely the proper point . . . for the mass production of quality candy. This same plant uses an automatic long cycle tempering to condition the chocolate before it enters the enrobers.*

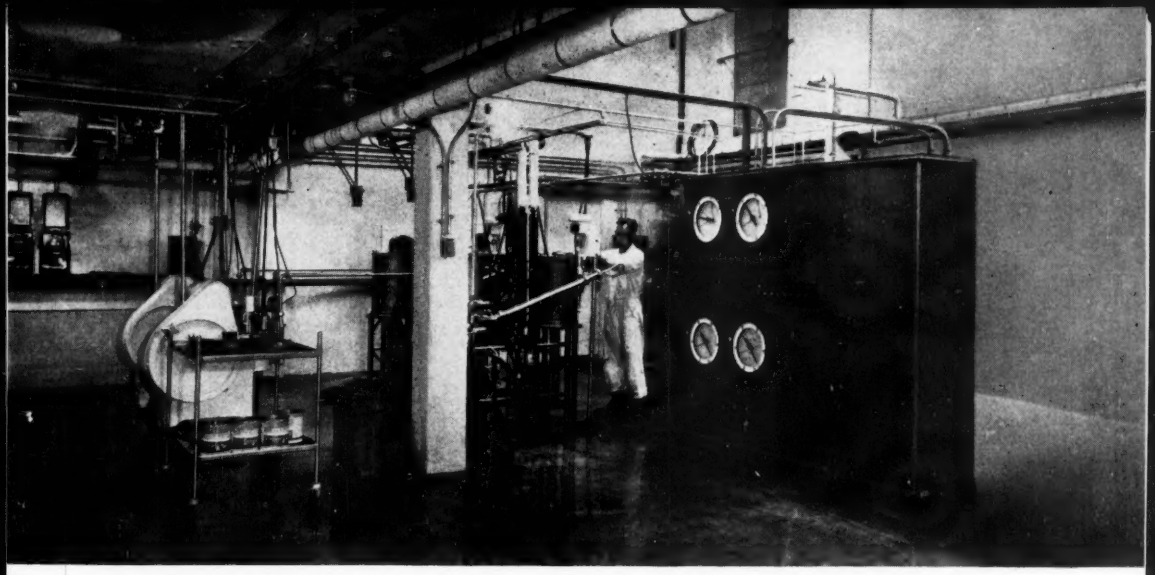
For all of industry . . . *especially*

Instruments

HIGH QUALITY *heat treating is a must for the dies used in precision forging of jet-engine turbine blades. These* **ElectroniK** *instruments provide the sensitive, accurate control of treating temperatures necessary for the meeting of exacting specifications.*



HOLDING PRODUCT QUALITY *at a high level is one of the many important functions of Brown instruments. The pH controller shown with this Fourdrinier machine is part of a complete control system which helps insure continuous production of top quality sheet and board.*



CANNING FRESH WHOLE MILK *is a new high-quality operation which utilizes remarkably compact processing equipment and an* ***ElectroniK*** *control system to establish and maintain sterile conditions.*

for the food industry

increase quality

INCREASED QUALITY of product goes hand in hand with the acceleration of research and speeding of production that modern instruments are helping to accomplish throughout the Food Industry. And Brown instruments, featuring *ElectroniK* control, are leading the way to higher and higher standards of performance, particularly among the more revolutionary processes.

The ingenuity and experience gained through many years in all types of industrial activity, plus specialized knowledge of food processing applications, enables Honeywell to bring some of the toughest quality problems of the industry under automatic control.

A good case in point is the Aseptic Canning Process, developed by Dr. Martin of the James Dole Engineering Company, which requires split second and exact temperature control in the heat exchanger, with continuous temperature measurement at 8 different points. The special control system devised by Honeywell for this precedent-shattering process is already playing an important role in the economical production of top-quality products.

Other major improvements are being made in a great variety of food processing operations . . . and Honeywell engineers are continuing to cooperate with scientist and production man alike, to speed the newer techniques from the laboratory to actual process use. Our local engineering representative will welcome the opportunity to discuss advanced instrumentation for your processing operations . . . and he is as near as your phone.

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First in Controls

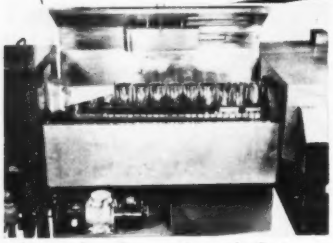
● *Important Reference Data*

Write for copies of new brochures . . . "Tomorrow is Today" and "Fundamentals of Instrumentation for the Industries."

Talk to a BARNES Process Engineer

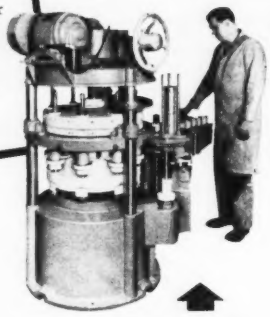
when you want to lower Food Packing Costs

Here are three of many Barnes' installations that have proven profitable to food packers. As with other Barnes equipment, these represent the results of our work in collaboration with food packers on specific problems. If you have similar or other problems in your plant for which you haven't found equipment or, where available equipment is inadequate, call in a Barnes' process engineer. He may come up with the solution.



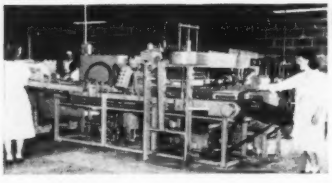
Valveless Straight Line Filler

This model 60 valveless straight line filler is one of the units used in the successful Martin Aseptic Canning System. It consists of a rectangular enclosure through which the cans are conveyed continuously in a straight line beneath a slit-type filling nozzle.



New, Fast, Efficient Double Seamer

This new closing machine features simplicity of adjustment, fast operation and identical seams. Moderate spindle speeds eliminate "bounce" over side seams and insure positive sealing. Write for additional data.



Unload 7 Cases Per Minute

This packer, faced with the problem of uncasing jars from cartons containing 36 jars for repacking into cases of 12, uses the above equipment to unload more than 7 cases per minute. Savings in labor and time are exceptional. If you have a similar problem we would be glad to furnish the packer's name upon request.

FREE ADDITIONAL DATA on these and other time and money savers for the food packer will be sent upon request. Write today. Ask for Bulletin 0000.

W. F. and JOHN BARNES

PROCESS EQUIPMENT DIVISION 320 SOUTH WATER STREET, ROCKFORD, ILLINOIS

(Advertisement)

STABILIZING ORANGE JUICE FLAVOR THROUGH ASEPTIC CANNING

Canners of any product are well aware of what happens when it is cooked by conventional canning methods and equipment . . . flavor is changed. Condensed or evaporated milk is a good example of the radical change that can take place in a product subjected to long periods of cooking. Recently the introduction and use of the Martin Aseptic Canning System has made it possible to can fresh whole milk *and retain the flavor of fresh whole milk*. In the frozen foods field the problem is a little different. For instance:

HAZARDS OF TEMPERATURE CONTROL IN FROZEN ORANGE JUICE

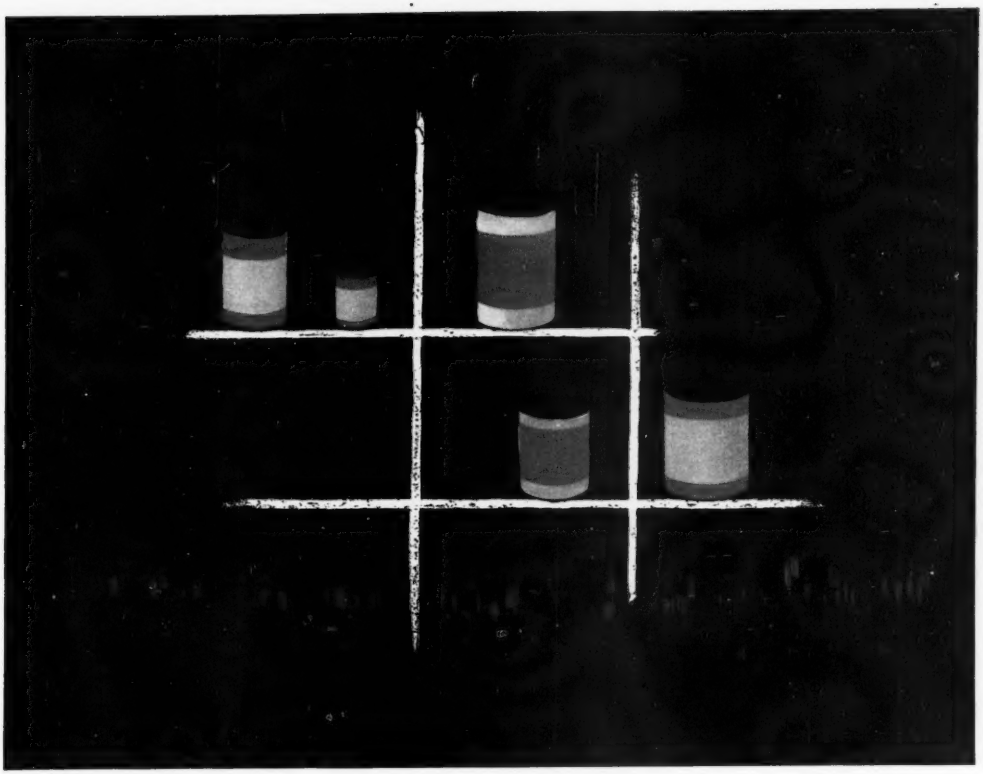
Every packer of frozen orange juice knows his product is palatable and close to fresh orange juice in taste when it leaves his plant. He also knows what changes in temperature can do to his product before it reaches the consumer . . . a small change in temperature can produce a great change in taste.

SHORT TIME HIGH TEMPERATURE ARRESTS CHANGES IN THE ORIGINAL FLAVOR, COLOR AND NUTRITIVE FACTORS

Canning in the Martin Aseptic Canning System retains the identity of the original product that is protected by short time high temperature sterilization. Orange Juice canned by this method will retain its original flavor after several months of storage at normal refrigeration temperatures.

The Martin Aseptic Canning System is particularly advantageous in canning heat sensitive products and products having poor heat transfer properties.

A handy slide rule for computing time and temperature requirements in aseptic canning is available upon request. Write to the W. F. and John Barnes Company, Process Equipment Division, 301 South Water Street, Rockford, Illinois.



Canners Are Sold on *SUGAR!* as a Selling Aid!

Why do most canners use sugar—and *only* sugar—in their packs?

One reason is the long-established superiority of sugar as a sweetening agent. Another reason for all-sugar packs is that sugar is the only sweetener which can be used alone in a wide variety of packs.

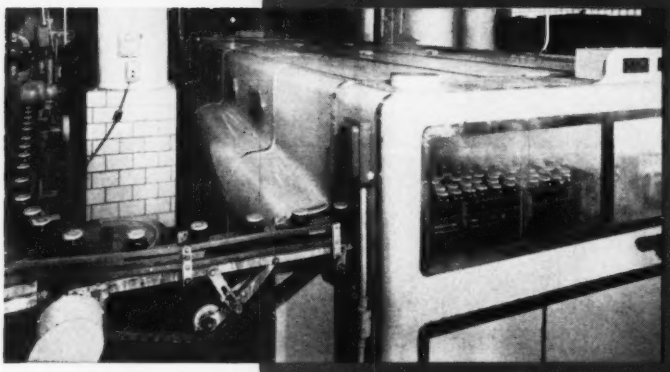
Sugar is economical. It gives you 10 to 50% more sweetening power. Sugar is easier to use. It requires no special handling or storage.

Sugar-sweetened packs taste better, keep better, sell better. Specify *sugar*. Make *quality* a *certainty!*

SUGAR
INFORMATION
INC.
NEW YORK 5, NEW YORK

THE VORTEX

ASSURES ECONOMICAL, CONTINUOUS



Automatic Cooling

FOR PALMER FRUIT PRODUCTS CO.

LONG ISLAND CITY, N. Y.

The "Vortex" method of cooling packaged products greatly reduces operating costs and achieves the positive time and temperature control which a quality product deserves. Entirely automatic in operation, it runs continuously with no operators required.

Heat transfer is accomplished by the famous Barry-Wehmiller "Vortex" system of atomized water sprays. The patented "walking beam" conveyor with two moving grates moves containers through the cooling cycle. Hydraulic drive not only dispenses with chains, gears and cams, but uses less power and holds friction to a minimum. Finger tip, automatic speed control accurately adjusts process time.

The "Vortex" coolers, pasteurizers and exhaust boxes have a wide variety of application in the food and beverage field. Write for bulletins and complete information.

THE SUN NEVER SETS ON B-W BOTTLE CLEANERS PASTEURIZERS & PROCESSORS

BARRY-WEHMILLER MACHINERY CO.

4660 WEST FLORISSANT AVENUE • ST. LOUIS 15, MO.

IN GREAT BRITAIN BW BARRY-WEHMILLER MACHINERY LTD. CANON MILL GUILDFORD ROAD MITCHAM JUNCTION, SURREY, ENGLAND

282

HYSTER® *Turret Trucks*
handle loads faster and cheaper in
FOOD MANUFACTURING AND WAREHOUSING

Hyster 20 (2000 lb. capacity)

Hyster fork-type Lift Trucks, Turret Trucks, Straddle Trucks® and Karry Kranes® have capacity ranges from 1000 lbs. to 30,000 lbs. Sold and serviced by Hyster dealers around the world.

FAST HORIZONTAL TRANSPORTERS for loads up to 4000 pounds. Hyster Turret Trucks go anywhere man-pulled or power-driven "walker-controlled" trucks can go, and go faster, loaded or empty. They operate an average 8-hour shift on a gallon of gasoline.

ANYONE CAN OPERATE — GREAT MANEUVERABILITY. Fully automatic clutch and transmission. No gear shifting. No levers. Tight quarters, narrow aisles and ramps are no problem. 360° steering is done through drive wheel. Truck "inches" along or goes 8 MPH fully loaded; 10-12 MPH empty.

LOW PURCHASE COST. One of the lowest priced, self-propelled materials handling trucks—in line with most "walker-controlled" units.

See your Hyster dealer, or write for literature. 4 models—PALLET, PLATFORM, CARGO and TUG.

HYSTER COMPANY

THREE FACTORIES

2902-35 N. E. CLACKAMAS, PORTLAND 8, OREGON
1802-35 NORTH ADAMS ST. . . PEORIA 1, ILLINOIS
1010-35 MEYERS STREET . . . DANVILLE, ILLINOIS

BACK IN THE 1880's

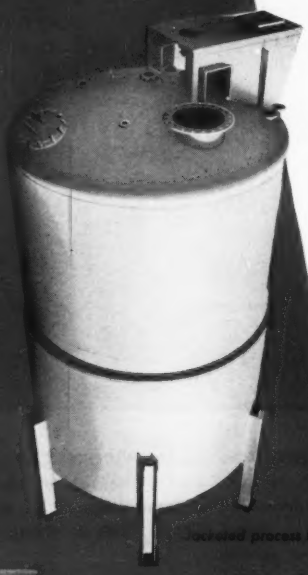
WHEN THE WELSBACH BURNER WAS INVENTED

Koven

WAS MAKING INDIVIDUALIZED FOOD EQUIPMENT

Just as Welsbach advanced lighting theory —so KOVEN forwarded industrial technique. Now a leader in steel fabrication, KOVEN creates Individualized Food Equipment that means increased production and greater profit because it is tailored to fit your specific needs. Call or write for a consultation —no obligation.

Our complete modern facilities include: machine, sheet and plate, welding and galvanizing shops, X-ray equipment and stress-relieving furnace. Among the many KOVEN products in all commercial and non-corrosive metals: Stainless Steel; Aluminum Sheet Fabrication; Boxes, Tote, Waste Cans; Chemical Apparatus; Coils and Pipe Bands; Copper Sheet Fabrication; Galvanizing Work; Mixers, All Kinds; Monel Metal Fabricators; Pails, Special Heavy; Pans, All Types, All Metals; Sinks, Scullery and Factory; Tables, Galvanized or Monel; Tanks, All Types, All Metals; Kettles, All Types, All Metals. Fabrication to A.S.M.E. Code Par. U-68 and U-69 a specialty.



Jacketed process tank

PLANTS:

Jersey City, N. J.

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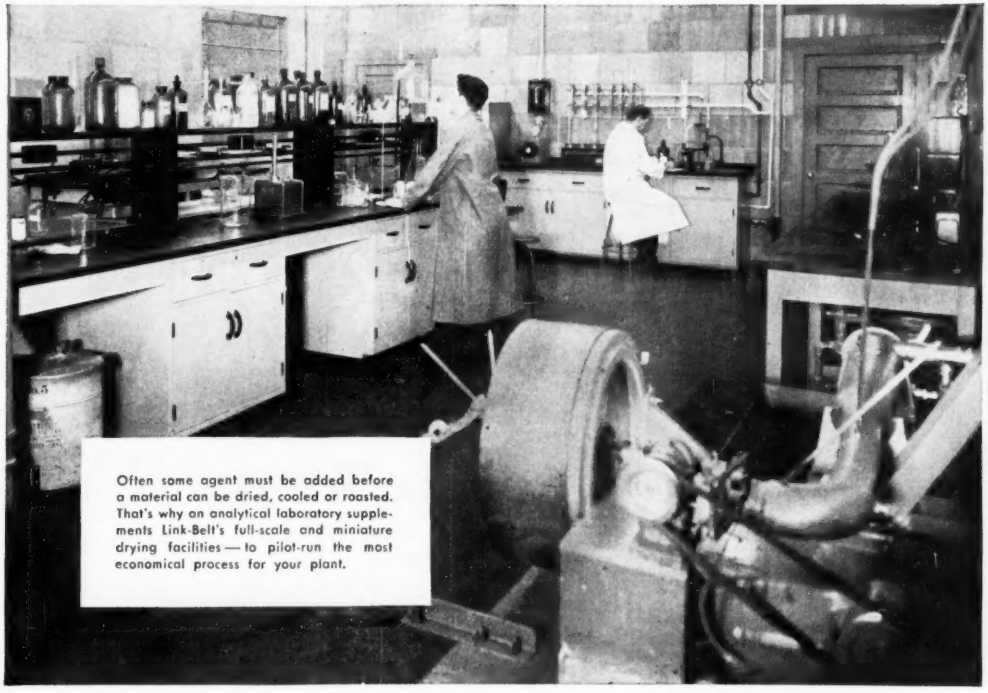
Storage tank made of steel

L. O. KOVEN & BRO., INC.
154 Ogden Ave.
Jersey City 7, New Jersey

KOVEN FOR INDIVIDUALIZED FOOD EQUIPMENT SINCE 1881

AN INVITATION
to manufacturers with drying, cooling or roasting problems...

We'll tell you how your material can be dried economically



Often some agent must be added before a material can be dried, cooled or roasted. That's why an analytical laboratory supplements Link-Belt's full-scale and miniature drying facilities — to pilot-run the most economical process for your plant.

LINK-BELT can analyze and test-run your material in the laboratory, work out processes that can be duplicated in your plant...

Don't gamble — you can be sure in advance what equipment, what processes are needed to dry, cool or roast your materials profitably. Take advantage of these facilities . . . send a sample — a pound or a ton of your product to the Link-Belt laboratory today.

Capitalize on the know-how gained through more than 1000 product tests we've conducted in this laboratory. Tests and research that have resulted in the installation of 500 Link-Belt Dryers in the field . . . successfully processing 100 different materials.

If you can't send samples, we'll be glad to put a unit on loan right in your own plant. For complete information, call your nearest Link-Belt office or plant . . . today.

12,270

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in principal cities.

PROTECT FLAVOR OR AROMA

...with tailor-made Riegel papers

A few things RIEGEL can do for you . . .

- Keep products dry
- Keep products moist
- Retard rancidity
- Retard mold
- Seal with heat or glue
- Provide wet strength
- Stop grease penetration
- Retain aromas, flavors
- Resist extreme cold
- Reduce breakage
- Prevent sifting
- Protect from light
- Resist alkalis
- Resist corrosion
- Boost machine efficiency

RETAINING FLAVOR OR AROMA is a problem that often arises in functional packaging. It is a problem Riegel has solved for many different products such as candy, coffee, soap and drugs. What is right for one product is seldom right for another. In one case the answer may be a standard glassine or greaseproof . . . in another it may be a special triple laminated paper. Whatever the answer may be, Riegel can usually tailor-make the right paper . . . quickly, efficiently, economically. Just tell us what you want paper to do for you. Write to *Riegel Paper Corporation, P.O. Box 170, Grand Central Station, New York 17, N. Y.*

Riegel FUNCTIONAL PAPERS FOR PROTECTIVE PACKAGING

▸ WRITE FOR SAMPLE BOOK

For Food Plant Cleaning

SOLVAY

Trade Marks SOLVAY and ⚓ Registered U.S. Pat. Off.

QUALITY PRODUCTS

SOLVAY offers you a superior line of cleansers for the food plant. Whatever your needs may be, you may be sure that there is a SOLVAY cleaning product to fit them. You may be sure, too, of the quality of these products . . . for SOLVAY is America's oldest and largest producer of alkalies and associated chemicals. For cleansers of dependable quality, specify SOLVAY.

For General Cleaning

New! Improved!

1 CLEANSER No. 600

A new, greatly improved formulation of one of America's best known general maintenance cleansers. Five modern ingredients combine their special properties to make "tough" cleaning jobs easier, more economical.

2 CLEANSER No. 615

A brand new cleanser of the 600 series, Cleanser No. 615 provides more detergent action for more difficult cleaning jobs. Specially developed for hard water, this product substantially cuts cleaning costs in these areas.

3 NYTRON

Solvay's new, exclusive wetting agent-detergent. Not an alkali, not a soap, not a mixture. Exceptional detergency and rinsability—in hot or cold, hard or soft water—combined with mildness and safety give Nytron a wide variety of uses in the food plant. It will not dull painted or polished surfaces . . . use it for regular cleaning of equipment, floors, walls, windows, trucks, etc.

For Special Cleaning

4 CAN WASHING CLEANSER

A brand new Solvay cleanser for machine can washing. Particularly effective for dairy cans, mixing vessels, etc.

5 GREEN LABEL COMPOUND

A new, low-cost can washing cleanser. Particularly effective in soft water. Special wetting agent provides exceptional performance at a low price.

For Heavy Duty Cleaning

6 CAUSTIC SODA

A basic alkali from America's oldest and largest producer. High pH and high neutralizing value give Solvay Caustic Soda "bite" that will do the most difficult cleaning jobs with highest efficiency.

For Bottle Washing

7 ANCHOR ALKALI

One of America's largest-selling bottle washing cleansers because it produces bright, sparkling-clean bottles at minimum cost. Anchor Alkali sterilizes effectively and rinses quickly and completely.

8 ACE ALKALI

Solvay's brand new bottle washing cleanser. A premium product for premium performance . . . Ace Alkali produces exceptional results in the most difficult bottle washing operations and with the hardest water.

9 SPECIAL FLAKE ALKALI

For hydro and spray type bottle washing equipment, where foaming is a problem, specify Solvay Special Flake Alkali for best results.

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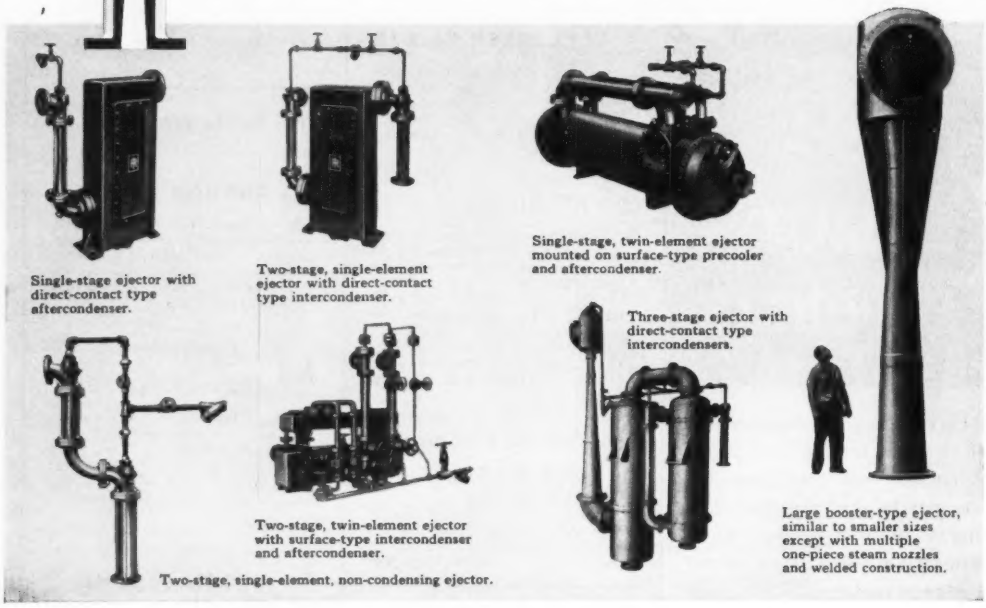
for suction pressures down to .002" (50 microns)

YOU CAN SAVE

operating and upkeep costs WITH I-R STEAM-JET EJECTORS



Single-stage ejector with direct-contact type aftercondenser.

Two-stage, single-element ejector with direct-contact type intercondenser.

Single-stage, twin-element ejector mounted on surface-type precooler and aftercondenser.

Three-stage ejector with direct-contact type intercondensers.

Two-stage, twin-element ejector with surface-type intercondenser and aftercondenser.

Two-stage, single-element, non-condensing ejector.

Large booster-type ejector, similar to smaller sizes except with multiple one-piece steam nozzles and welded construction.

Whatever the capacity—whatever the gases or vapors to be handled—Ingersoll-Rand steam-jet ejectors can generally do the job far more economically than any other type of equipment. Their utter simplicity of design and operation assures long life and sustained high efficiency, with practically no maintenance at all.

Suction pressure is obtained by a steam-jet discharging into a specially formed suction chamber and venturi-shaped diffuser. That's all there is to it. There are no moving parts to wear out—no excessive noise—no vibration. Ejectors can be installed anywhere, with little or no foundation, and can be operated by inexperienced personnel.

Single-stage, two-stage and multi-stage ejectors can be supplied in any required combination—with pre-coolers, intercondensers and aftercondensers to meet the specialized needs of practically any application for suction pressures down to 50 microns (.002" Hg absolute).

Ingersoll-Rand's unequalled experience in vacuum equipment—both steam-jet ejectors and reciprocating pumps—is your assurance of impartial service in meeting your low-pressure requirements. For further information, contact your nearest I-R representative, or write for a free copy of Bulletin 9013A.

Ingersoll-Rand

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COMPRESSORS • AIR TOOLS • ROCK DRILLS
TURBO-BLOWERS • CONDENSERS • CENTRIFUGAL PUMPS
DIESEL & GAS ENGINES

FRUEHAUF'S 500 GIVE YOU CUSTOM-FITTED BODIES AT STANDARD PRICES

YES—a choice of more than *500* standard truck body options, and many more specials. Precision engineered and ready for *immediate assembly* at your nearest Fruehauf Branch—to your *exact* specifications. You get custom-fitted truck bodies at production-line prices, because they're *"Unit-Built"!*

ASK for Fruehauf's free Model Make-Up Kit. It's easy to assemble your own scale model in a jiffy before choosing the body you want.

FRUEHAUF Truck Bodies

UNIT-BUILT FOR IMMEDIATE ASSEMBLY AT YOUR FRUEHAUF BRANCH!
VALUE-BUILT FOR BIGGER PAYLOADS, LOW UPKEEP, LONGER LIFE!

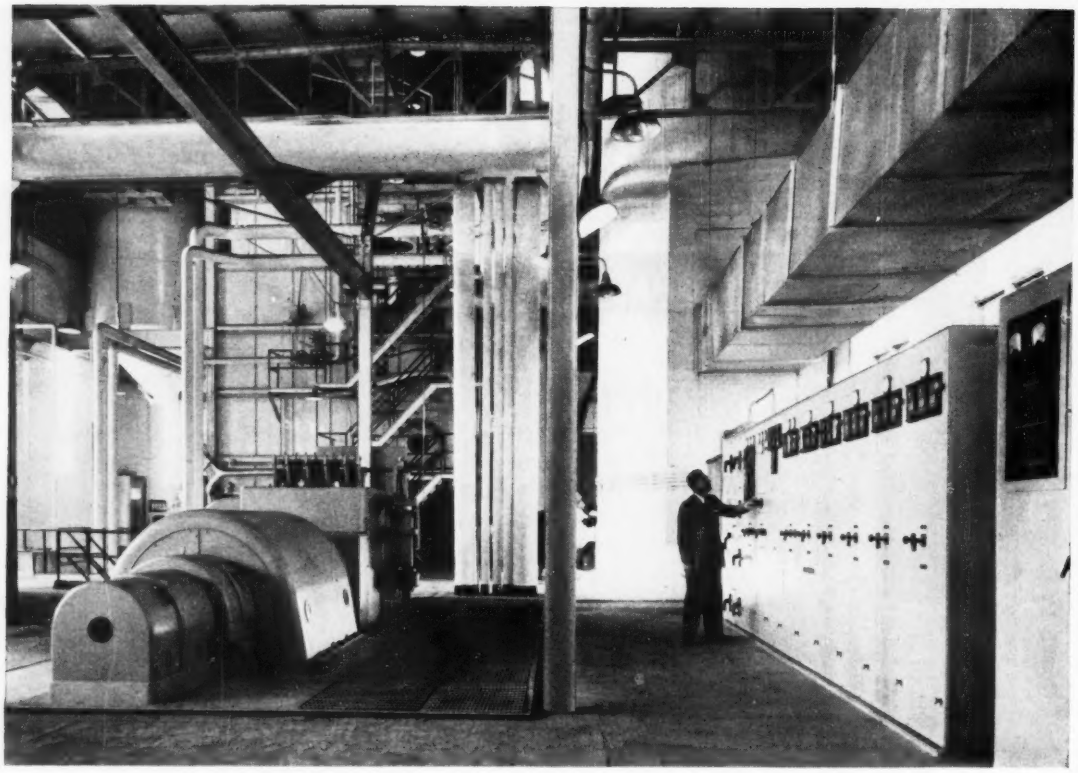
The Choices You Get in *Fruehauf's 500*

- ★ Straight or wheelhousing all-steel frames
- ★ All popular body lengths of each type
- ★ Closed or open top and back
- ★ All standard and special door locations and sizes
- ★ Complete variety of tailgates and steps

Plus These *Added* Fruehauf Advantages

- ★ All-steel roof with coin-pressed seams
- ★ Welded, light-weight, flush-swinging doors
- ★ Fast, inexpensive repairs on these stock assemblies
- ★ Over 80 convenient Factory Branches coast to coast!

Truck Body Division
FRUEHAUF TRAILER COMPANY
Detroit 32, Michigan



Great Western's power-house equipment comprises G-E turbine-generator set, G-E metal-clad switchgear, and new boiler (rear). G-E turbine specialists worked in close co-operation with the boiler manufacturer to assure ample power and process steam with maximum economy. Switchgear units control power distribution at 4160 volts to five G-E load-center unit substations throughout the plant.

Great Western improves plant efficiency with modern G-E power system

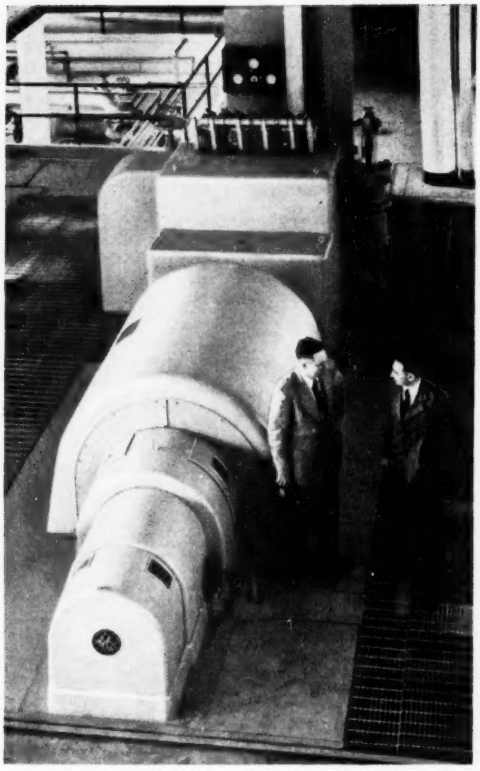
Complete modernization program undertaken at Longmont plant to meet expanding needs for power and process steam

Continuing its company-wide modernization program, Great Western Sugar Company recently completed the first step at its Longmont, Colorado plant: modernization of the plant power station. To fill increased process steam requirements and to furnish high-voltage power for more efficient distribution, a new General Electric high-pressure turbine-generator set was installed, along with two modern boilers.

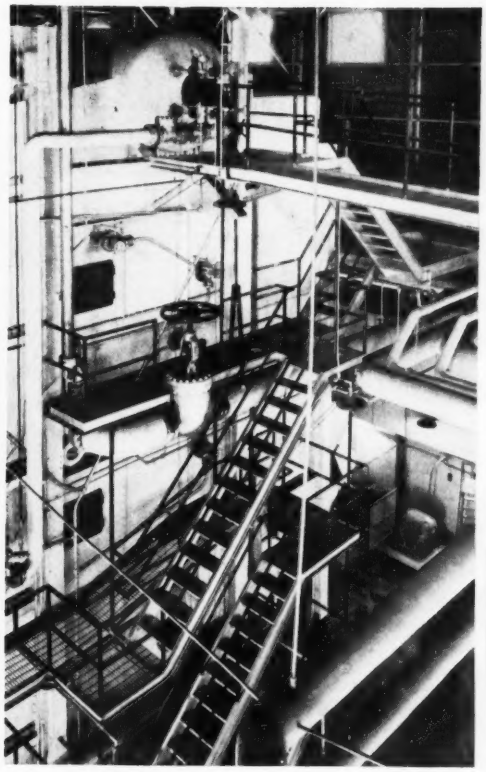
Modernization can increase the efficiency of *your* food plant the same way, and G-E system engineering will be an important aid. Call in your G-E food industry specialist—early in your planning. *General Electric Company, Schenectady 5, N. Y.*

New G-E Motor Course

The new G-E Motor Selection and Application Course, a "More Power to America" program, can give your workers more motor "know-how" in 9 easy-to-take lessons. For details, send for Bulletin GEA-4938-16.

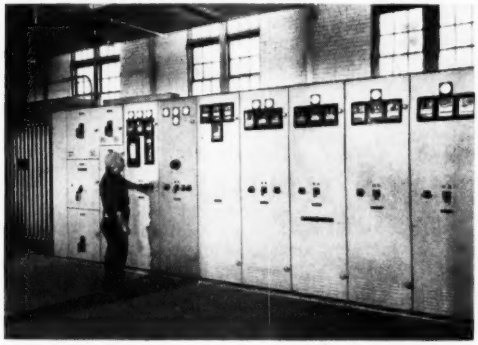


Power for entire plant is supplied economically by this 3500-kw G-E turbine-generator set. This unit utilizes steam with high efficiency—provides closer heat-balance control.

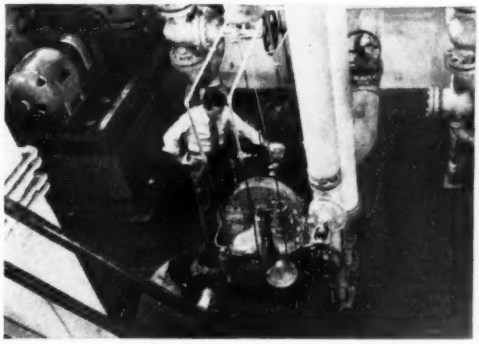


New 150,000 lb. steam boiler is one of two replacing ten formerly used. At lower right, driving the boiler draft fan, is a G-E 200 hp Tri-Clad* motor, triply protected against operating wear and tear.

*Reg. Trade-mark of General Electric Company.



Factory-assembled G-E switchgear, rated 150 MVA, was shipped as a co-ordinated unit for easy, low-cost installation. The equipment is metal-enclosed for personnel protection and low maintenance.



Low-cost, mechanical power is provided by this G-E mechanical-drive turbine driving main boiler-feed pump. Hydraulic governing provides wide adjustable speed range. Standardized replacement parts keep inventory costs low.

GENERAL ELECTRIC

C52-11

KEITH A. FITCH
Executive Director, formerly with U.S. Food and Drug Administration, Calif. Bureau of Food and Drug Inspections and Standard Brands Inc.

HERMAN L. FELLTON
Vice-President, registered professional sanitary engineer, formerly a commissioned officer with U.S. Public Health, member of many honorary societies.

ROBERT M. RUSSELL
Sanitation Consultant with degree in chemical engineering with experience in all phases of environmental sanitation and food processing control.

ORMAN H. GLAZIER
Sanitation Consultant with experience in public health, dairy science and bacteriology. He holds a Masters degree from Yale in Public Health.

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A Distinctive Service

Complete consultive and inspectional sanitation services designed to meet your demands for quality control are now available to all types of industry.

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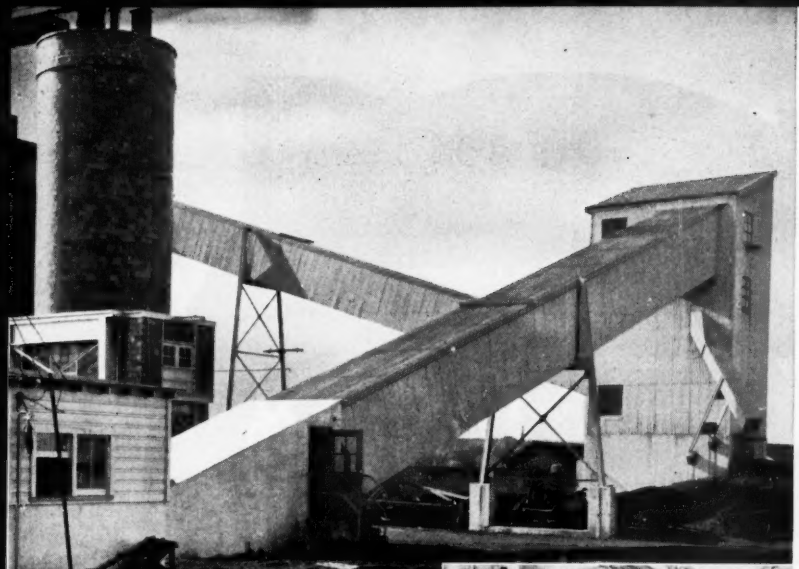
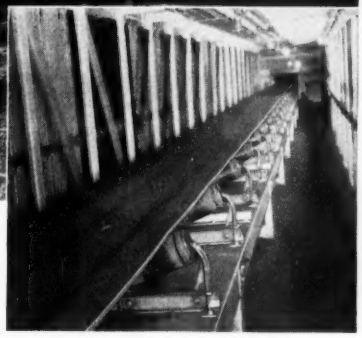
Sanitation Consultant with degree from Georgetown University, formerly with Continental Foods, Inc., U.S. Food and Drug Administration.

LESTER A. MEIS
Sanitation Consultant, M.P.H. from Univ. of Calif.; Kellogg Foundation, Continental Baking Co.; Sanitation Inspector U.S. Dept. of Navy.

MURRAY I. COOPER
Sanitation Consultant, Ph.D. from the University of Illinois; experienced in sanitation education and laboratory detection of extraneous matter in food.

MAX ISBELL
Sanitation Consultant, a Fellow of the Royal Entomological Society of London with many years practical experience in industrial pest control.





Starts fast at forty below...

This belt conveyor carries coal from railroad cars to overhead hoppers for a power company located in the northern part of the Midwest . . . so far north that temperatures frequently hit forty below zero. Starting the conveyor in that kind of weather meant lost time, wasted manpower. The bearing lubricant became so stiff that five or six men often were required to pull on the belt. Three hours a day frequently were lost in getting the unit in operation.

As many as a dozen conventional lubricants were tried without success before a change to STANOLITH Grease No. 42 was made on the recommendation of a Standard Oil lubrication specialist. None could match the ability of STANOLITH to provide easy starting at extreme low temperatures, and still maintain effective lubrication during high summer temperatures.

STANOLITH Greases are filling the bill in a wide range of industrial and processing applications because of their resistance to heat and to the washing action of water, and their ability to flow readily under wide variations in temperature. A Standard Oil lubrication specialist can help you take advantage of these special properties. A call to your local Standard Oil Company office is all that's necessary. Or write: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANOLITH
TRADE MARK
Greases

What's your problem?

Meet R. R. Rowlands, of Standard's La Crosse office. He is the lubrication specialist who worked with this power company to find the right grease for an especially tough job. And as a result of his work, the company was able to save considerable time in the operation of a coal conveyor.

His on-the-job service is typical of that available to all midwest plants through a corps of such lubrication specialists. You can be sure that the specialist in your own area has both the practical experience and the training in a Standard Oil Lubrication Engineering School that will result in dependable, thorough assistance.

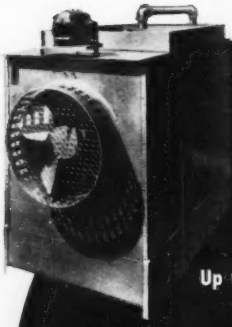
Why not call your local Standard Oil Company office today? Put a lubrication specialist to work on your problem now. When he calls, be sure to discuss the advantages and performance records of these outstanding products:

STANOIL Industrial Oils—This multi-purpose line of oils provides cleaner operation of hydraulic units, supplies effective lubrication in air compressors, gear cases, and circulating systems. One or two grades can replace a wide variety of special oils and lubricants.

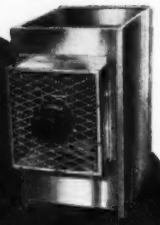
CALUMET Viscous Lubricants—These greases strongly resist washing and throw-off. Their superior wetting ability affords better coating of open gears and chains, better internal lubrication of wire ropes.

STANDARD OIL COMPANY

STANDARD (*Indiana*)



Up to 60 tons capacity

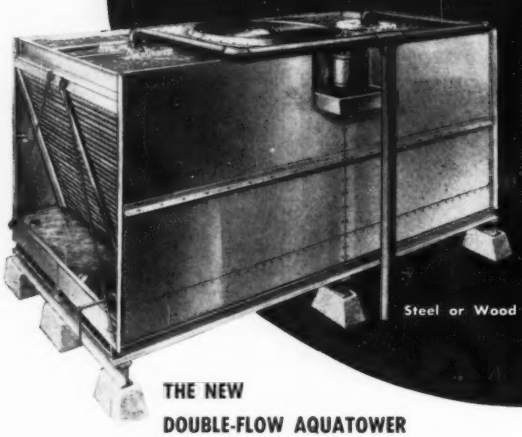


2 to 6 ton range

17 Sizes of

MARLEY AQUATOWERS

one for every water cooling job



Steel or Wood

THE NEW DOUBLE-FLOW AQUATOWER

50 tons or more capacity

The only *complete* line of "packaged" water cooling towers is the AQUATOWER line. In the 2 to 6 ton range, Marley offers Model 23 and 33 Aquatowers —small, compact units that soon pay for themselves in any service requiring as little as 6 gpm.

For intermediate capacities, you can choose from 8 standard size Aquatowers that fit any cooling requirement in that capacity range, indoors or out.

On jobs requiring 50 or more tons of refrigeration, Marley offers the NEW DOUBLE-FLOW AQUATOWER, the lowest silhouette, lowest pumping head tower. In this newest cooling tower, one fan utilizes air from two completely open sides, combining great efficiency and power economy.

Aquatowers in all sizes conform to building codes. Small and medium-sized units are shipped completely assembled and Double-Flow Aquatowers are prefabricated for ease of construction.

For complete information, call the Marley representative in your city or write for Bulletin AQ-52.

producers of

DOUBLE FLOW TOWERS
DRICOOLERS
AQUATOWERS
NATURAL DRAFT TOWERS
CONVENTIONAL TOWERS
SPRAY NOZZLES
VAIRFLO TOWERS
DOUBLE FLOW AQUATOWERS

MARLEY

The Marley Company, Inc.

WORLD'S LEADING PRODUCER OF WATER COOLING TOWERS

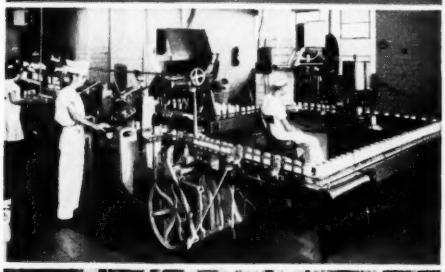
Kansas City 5, Missouri

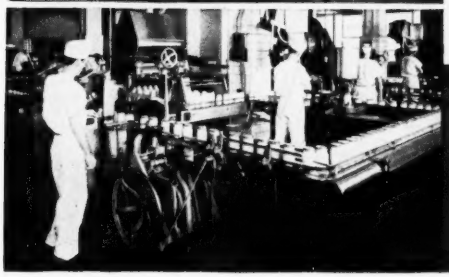
For more information, use post card on last page.

WORLD BEE-LINE LABELER

ORDER THIS "BLUE PLATE SPECIAL"

and you'll get more for your money, too!





WORLD AUTOMATIC BEE-LINE LABELERS are the order of the day to meet the range of glass container and label sizes and shapes of quality producers of glass packed foods.

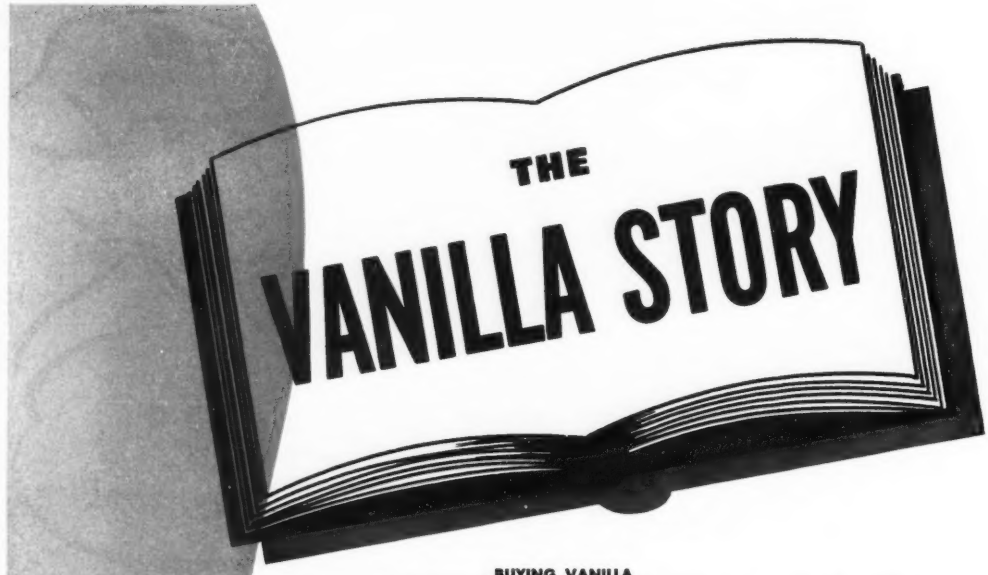
Blue Plate Foods have *seven* BEE-LINES at their fine modern plants in New Orleans, Fort MacPherson, Ga., and Richmond, Va.—turning out good looking packages of preserves, mayonnaise, peanut butter, etc., with clean, smooth, precisely positioned Blue Plate labels.

The World *Bee-Line* has the capacity, the versatility, the dependability and the low operating cost you're looking for. Ask us for layouts, recommendations, estimates.

YOU GET THE BEST LABELERS IN THE WORLD

ECONOMIC MACHINERY CO.
WORCESTER 3, MASSACHUSETTS
DIVISION OF GEO. J. MEYER MANUFACTURING CO.
MILWAUKEE, WISCONSIN

New York • Philadelphia • Pittsburgh • Chicago • San Francisco • Los Angeles
Denver • Louisville • Salt Lake City • El Paso • Seattle • Portland • Phoenix
London • Montreal • Toronto • Winnipeg • Newfoundland • Vancouver
Mexico City • Sydney, Australia • Wellington, N. Z. • San Juan, P. R.
Ciudad Trujillo, D. R. • Honolulu, T. H.



BUYING VANILLA
IS A CONFUSING JOB AND KNOWING WHAT YOU'RE GETTING IS EVEN MORE DIFFICULT.

Here's the Reason

The finest flavor is that of an old fashioned, leisurely extract of the best Mexican or Bourbon beans. Due to yield and time required, such extracts are seldom seen in today's market. To meet practical price requirements, economies are used, such as speedier and exhaustive extractions, cheaper grades and powdered beans . . . then for further savings, the imitations, using vanillin, other aromatics and even coumarin. Each has its flavor value yet each step carries flavor farther from true vanilla. In trying any vanilla, pure or imitation, compare it to the finest pure extract. Get the best you can afford.

ALVA can supply the finest as well as every other practical grade of vanilla for every use, honestly priced and honestly labeled. Here are a few:

- Pure Vanilla Extracts, single strength, 2, 4 and 10 fold
- Oleo Resin Pure Vanillas
- Imitation Vanillas
- **ALVANYA** (imit. vanilla absolute) duplicating the aromatic portion of the bean itself. Excellent when used alone or to improve any commercial vanilla at a saving. Extreme temperature stability.
- Vanilla sugars, pure and imitation.

Tell us what you want and we will send you the best vanilla to meet your requirements.

VAN AMERINGEN-HAEBLER, INC.
521 WEST 57th STREET, NEW YORK 19, N. Y.

Alva FLAVORS

the STETSON is part of the man

JOHN B. STETSON COMPANY
PHILADELPHIA 22, PA

Mr. C. C. Lucas
Howell Electric Motors
Broad Street Suburban Station
Philadelphia, Penna.

Dear Mr. Lucas:

It is not every day these days that a buyer can express his thanks and appreciation to a vendor for prompt compliance with scheduled delivery dates.

I want to do just that to you and, through you, to the Howell Electric Motors. While I am at it I wish to mention, also, that we are very pleased with the quality of workmanship and cleanness of design of your motors. Because our own product owes its national eminence to quality, we feel peculiarly fitted to recognize that standard in others.

With appreciation for your individual interest and the valuable cooperation of your factory, I remain

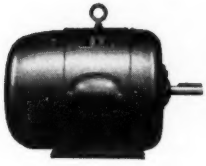
Yours very truly,

A. Kennedy, Jr.
Plant Engineer

AKjr/mc

MORE PEOPLE WEAR STETSON HATS THAN ANY OTHER BRAND

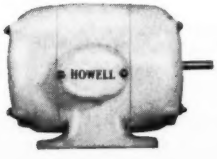
HOWELL MOTORS are part of the STETSON



HOWELL Type K Motor. Offers constant performance in the presence of dirt, dust, fumes and moisture. Sizes from 3 to 150 H.P. at 1800 R.P.M. Either vertical or horizontal mounting.

We think you, too, will appreciate Howell's attention to your electric motor problems. Howell engineers are always ready with technical assistance on motors in the standard NEMA frame sizes or with specially designed motors if your situation requires them.

So, on the tough jobs, on every job, consult Howell — manufacturers of industrial type motors from 1/6 to 200 H.P. since 1915. Contact the Howell representative in your city or write to us direct.



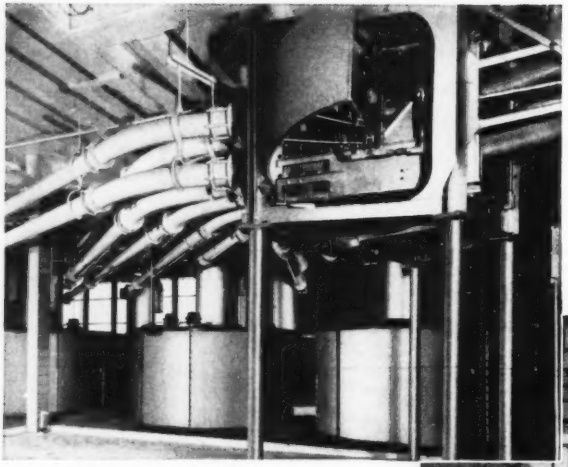
HOWELL Sanitary Motors meet the most exacting standards of the dairy and food industries. They contain no pockets, cracks, or crevices. Available for vertical or horizontal mounting.

HOWELL Red Band MOTORS

HOWELL MOTORS

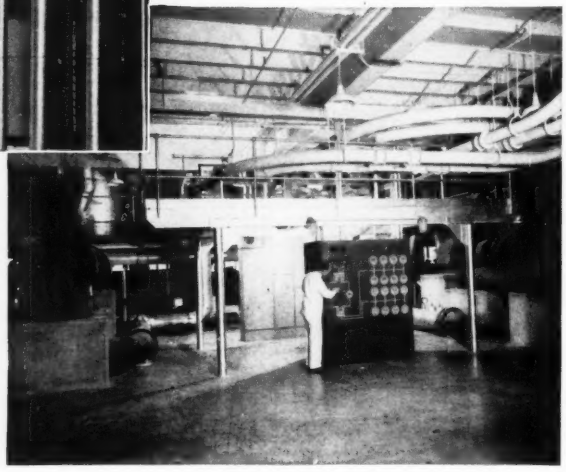
HOWELL ELECTRIC MOTORS CO., HOWELL, MICH.

Precision-built Industrial Motors Since 1915



The AIRVEYOR®

CONVEYING FLOUR AND SUGAR



Another

NABISCO

INSTALLATION

Photo, top left: Eight-way, duplex-motorized switch, for distributing materials to storage bins. Lower tier of tubes conveys materials, upper tier for return of dust to system. This equipment was designed by Fuller Company engineers and built in its shops.

Photo right: Two positive-pressure, direct-driven exhauster-blowers in foreground, right and left. Airveyor filters directly behind exhausters. Control board, center, with push buttons and indicating lights, indicates routing of materials and shows which bins are full or empty. The mere pressing of buttons enables one man to operate the systems from this single nerve center.

On the strength of past performance, the Portland, Oregon Bakery, newest and most modern of National Biscuit Company's plants, has been equipped with the Airveyor for handling flour and sugar.

These two foodstuffs are conveyed from either box cars or Trans-Flo bulk cars to a total of 17 storage bins. Distribution into bins is completely airborne, dust-free and sanitary, with all electrical controls centralized in a single master control board.

Two independent systems are being used, which can be operated alone or simultaneously, either one being completely capable of performing the duties of the other.

Why not investigate the possibilities of this flexible system of handling foodstuffs? Without obligation, a Fuller engineer will analyze your present conveying system and show you how the Airveyor can be of great help in your operations.

Fuller

DRY MATERIAL CONVEYING SYSTEMS AND COOLERS—
COMPRESSORS AND VACUUM PUMPS—
FEEDERS AND ASSOCIATED EQUIPMENT

FULLER COMPANY, Catasauqua, Pa.
Chicago 3—120 S. LaSalle St.
San Francisco 4—420 Chancery Bldg.

A-132

Sell as you Ship
with **RHEEMCOTE** drums

The only large steel containers with all these extra points of value!

- **Any design, including halftones,** lithographed in as many colors as you want.
- **Entire surface** of drum can be used for your selling design.
- **Family identification** can now be achieved by using same design on all containers, large or small.
- **Tough, high-gloss finish** is baked on for durable, handsome appearance.
- **Interior can be coated** with special protective lacquers.
- **Electric resistance-welded seam** is smooth and clean.

Use this powerful new advertising medium. For more information, write

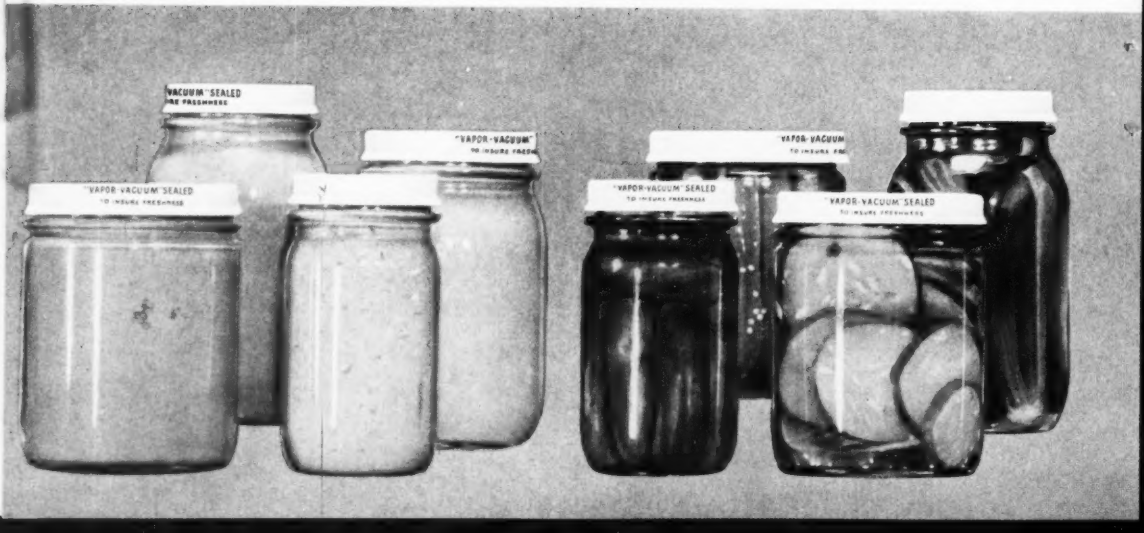
RHEEM

RHEEM MANUFACTURING COMPANY • General Sales Offices, 570 Lexington Avenue, New York 22, N. Y.
Manufacturing Plants in 23 Cities Around the World — PLANTS AND OFFICES: BAYONNE, LINDEN, NEW JERSEY • CHICAGO, ILL. HOUSTON, TEXAS • NEW ORLEANS, LA. • NEW YORK, N. Y. • NEWARK, RICHMOND, SAN FRANCISCO, SAN PABLO, SOUTHGATE, CALIF. SPARROWS POINT, MD. • FOREIGN PLANTS: BRISBANE, FREMANTLE, MELBOURNE, SYDNEY, AUSTRALIA • BRISTOL, ENGLAND • BUENOS AIRES ARGENTINA • HAMILTON, ONTARIO • LIMA, PERU • RIO DE JANEIRO, BRAZIL • MILAN, ITALY • SINGAPORE

©1952 RHEEM MFG. CO.

Here, several times enlarged, is the design and construction of Vapor-Vacuum's Wide-mouth Slip-on... the most spectacular and most beautiful of all wide-mouth seals.

The only wide-mouth cap with one hand slip-on and slip-off action



Wide-Mouth Slip-on

"VAPOR-VACUUM"

World's most beautiful closure!

In the famous family of Vapor-Vacuum Caps, the most spectacular member is the Wide-mouth Slip-on.

The Wide-mouth Slip-on offers a *combination of advantages possessed by no other wide-mouth food closure.*

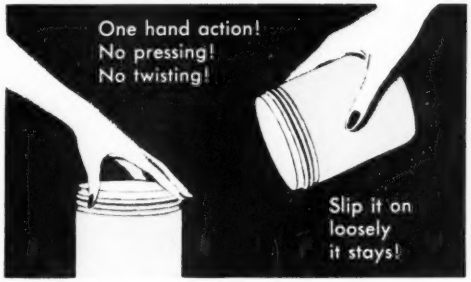
To begin with, there's its obvious beauty . . . a look of solidity and luxury which sings out from the dealers' shelves. Beyond question, it is the world's most beautiful closure.

What's more, the beauty factor is only the beginning of this cap's remarkable story. Even more important, there's the *utility* factor which puts the Wide-mouth Slip-on in a class by itself for certain types of food products.

Catsup-Cap action in a Wide-Mouth seal

The Wide-mouth Slip-on is the only cap in the world which lets wide-mouth ware give the same service performance as the famed slip-on catsup bottle—the most popular of all glass packages. The construction of the cap and its glass finish employ the same principles as the Narrow Slip-on—the cap which seals nearly all catsup.

Hence, in the all-important after-opening stage, the



Wide-mouth Slip-on need only be *slipped* back onto the package. Without pressure, without requiring the use of both hands, it drops into position—and stays! Even when not pressed home, it makes a dust proof and odor proof cover, which won't fall off.

Here, then, is a basic advance in the art of glass packaging. It gives the packer all the usual advantages of Vapor-Vacuum *efficiency in production* and *worry-free sealing*—plus unmatched beauty and greatly increased utility.

Can any other closure offer as much?

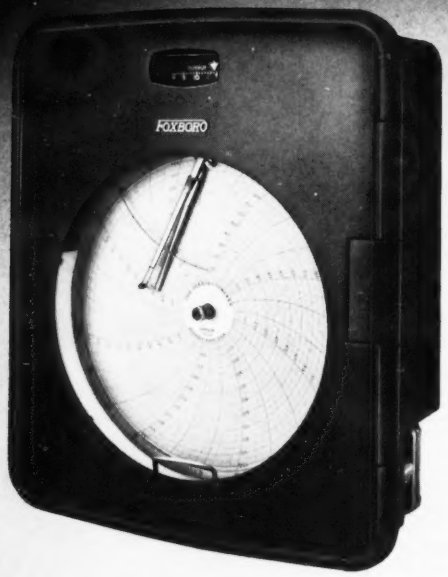
"VAPOR-VACUUM" Seal and Re-Seal

PRODUCT OF WHITE CAP COMPANY

CHICAGO • NEW YORK • SAN FRANCISCO • ROCHESTER • PHILADELPHIA • LONDON, ENGLAND

better measurement and control of

TEMPERATURE



−350°F to +2800°F

Throughout the vast field of industrial temperature instrumentation, Foxboro will be found in the greatest number of installations where complete reliability and most economical fulfillment of optimum accuracy are vital. If your process requires temperature measurement or control in any range between −350°F. and +2800°F., the high engineering standards and complete diversity of Foxboro Instruments . . . backed by Foxboro's unequaled application experience . . . offer you the way to obtain it most effectively.

INDICATORS • RECORDERS • CONTROLLERS

electric, electronic and pressure-filled thermal systems

TRANSMISSION SYSTEMS • CONTROLLED VALVES

FOXBORO

Reg. U. S. Pat. Off.

For over 40 years, specialists in the measurement and control of temperature, pressure, flow, liquid level, humidity . . .

THE FOXBORO COMPANY • FOXBORO, MASSACHUSETTS, U.S.A.

Straight-from-the-shoulder facts show you save in every way with

CHEVROLET *Advance-Design* TRUCKS

FACT No. 1

COSTS LESS TO BUY

Match a Chevrolet truck against any comparable truck capable of handling the same payloads. You'll find Chevrolet trucks *list for less*, yet bring you ruggedness, stamina and great features not found in the other truck.

FACT No. 2

SAVES MONEY ON THE JOB

Experienced truck operators know Chevrolet trucks cost least to own and maintain. Valve-in-Head economy, in the Chevrolet Loadmaster or Thriftmaster engines, saves on gas. Four-way engine lubrication reduces wear and oil costs. Rugged construction means long life.

FACT No. 3

RIGHT TRUCK FOR EVERY LOAD

Chevrolet trucks are *factory-matched* to your payload and service requirements. You don't buy "too much truck" or "too little truck." Frame, axles, springs, body, brakes and power are *balanced* for the job.

FACT No. 4

KEEPS ITS VALUE LONGER

Records show that Chevrolet trucks traditionally bring more money at resale or trade-in than many other makes. Chevrolet's market value stays up because the value stays *in!* More proof that Chevrolet is the best truck buy! See your Chevrolet dealer soon.

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load • POWER-JET CARBURETOR—for smooth, quick acceleration response • DIAPHRAGM SPRING CLUTCH—for easy-action engagement • SYNCHRO-MESH TRANSMISSION—for fast, smooth shifting • HYPOID REAR AXLE—for dependability and long life • TORQUE-ACTION BRAKES—on light-duty models • PROVED DEPENDABLE DOUBLE-ARTICULATED BRAKES—on medium-duty models • TWIN-ACTION REAR BRAKES—on heavy-duty models • DUAL-SHOE PARKING BRAKE—for greater holding ability on heavy-duty models • CAB SEAT—with double-deck springs for complete riding comfort • VENTI-PANES—for improved cab ventilation • WIDE-BASE WHEELS—for increased tire mileage • BALL-TYPE STEERING—for easier handling • UNIT-DESIGNED BODIES—for greater load protection • ADVANCE-DESIGN STYLING—for increased comfort and modern appearance.

CHEVROLET DIVISION OF GENERAL MOTORS, DETROIT 2, MICHIGAN

first in demand in value in sales **CHEVROLET**

Nash Instrument Air Compressors deliver only clean air, free from oil or dust, and without filters

Here is Why!

You can dispense with oil filters and dust filters when you install ®Nash® Clean Air Compressors. You can save the cost of maintaining these devices. You can greatly reduce instrument maintenance costs. For the Nash employs no internal lubrication, therefore no troublesome oil is in the delivered air. Moreover, air from a Nash is thoroughly washed and cooled as it passes thru the pump. Dust in the plant atmosphere, even fly ash, is immediately removed.

®Nash® Clean Air Compressors are simple, with only one moving element. No valves, gears, pistons, sliding vanes, or other enemies of long life and constant performance complicate a Nash. No aftercoolers are needed. You will find it profitable to investigate these pumps, now.

No oil filters.
No dust filters.
No internal lubrication to contaminate air handled.
No internal wearing parts.
No valves, pistons, or vanes.
Non-pulsating pressure.
Original performance constant over a long pump life.
Low maintenance cost.

NASH ENGINEERING COMPANY
377 WILSON, SO. NORWALK, CONN.

"Whatever Your Conveyor Belting Problem . . . *Thermoid Has The Answer*"

Perhaps your problem is handling packages on an incline of 25—even 35—degrees. You'll find the solution in Thermoid "Ruff-Top" Conveyor Belting—with its thousands of small, rough, irregular-shaped points of soft rubber that take a firm grip on the lightest packages or cartons.

But whatever the job—whatever the nature of materials to be handled—heavy or light, soft or abrasive, hot or cold, wet or dry, uniform or non-uniform in size—consult your Thermoid distributor. He can recommend the right type of Thermoid Belt to do the job at the lowest cost per ton of material moved.

Thermoid's extra margin of endurance means fewer delays due to belt breakage or premature wear.

Here's The Book That Will Answer Many Of Your Questions

Drop us a line for your free copy of Book No. 3679. It is a handy reference guide, concise and complete. 16 pages of valuable charts, tables and graphs tell how to select the right conveyor or elevator belt for the materials to be handled . . . how to determine capacities, speeds, weights and number of plies.

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Thermoid

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah

A Timely Message to the Margarine Industry *

PFIZER Pure Vitamin A

Excels for MARGARINE

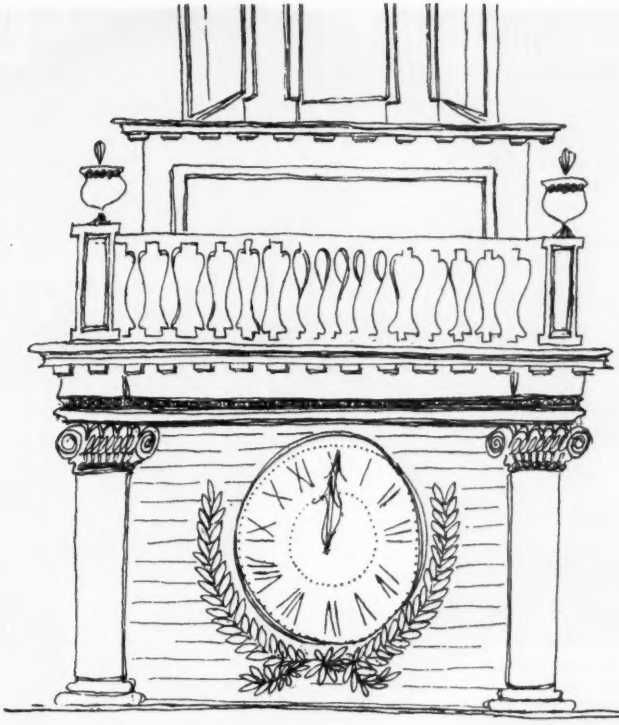
• Now...a new *pure* Vitamin A becomes available to the margarine industry — Pfizer pure Crystalline Vitamin A Acetate dissolved in Cottonseed Oil. This product is the result of long research and testing in Pfizer laboratories. In fortifying your margarine, it will prove both profitable and easy to use. Check these noteworthy advantages:

This product is odorless and tasteless. Its blandness assures you that it will blend perfectly with other ingredients and there is no danger of off-tasting, off-odor batches.

It is highly stable both by itself and when incorporated in margarine. This can mean real savings since excess overages will not be required.

Pfizer Crystalline Vitamin A Acetate in Cottonseed Oil is uniform. Every shipment meets the rigid quality control maintained by Pfizer for over one hundred years. Supplied in bulk or batch-size cans, Pfizer Vitamin A for margarine is packed for your individual requirements. It will not crystallize at refrigerator temperatures. No change in handling procedure is necessary.

**Refer to Applicable F. D. A. Standard of Identity*



Fortification!

Pfizer is a dependable source. Year-in and year-out your requirements will be met from the newly expanded plant at Groton, Connecticut — one of the largest, most modern vitamin plants in the world. We think you'll agree that your margarine deserves the product that offers all these advantages... Pfizer Crystalline Vitamin A Acetate in Cottonseed Oil. We will be most happy to discuss your requirements with you. *Phone or write:*

CHAS. PFIZER & CO., INC.
630 Flushing Avenue, Brooklyn 6, N. Y.
Branch Offices: Chicago, Ill. • San Francisco, Cal. • Vernon, Cal.

PFIZER QUALITY®

PFIZER

Pioneers and Leading Manufacturers of Vitamins

OUR 60TH ANNIVERSARY

Your Visible Proof of Invisible Quality

Be sure it's . . .

You can't check the bronze or analyze the steel or examine the fits between mating parts of a speed reducer. But you can count on the name of the manufacturer. The name Philadelphia on a product means 60 years of experience in making power transmission equipment. It stands for a company that builds all types and sizes of speed reducing units.

The worm gear reducer shown here is just one unit of a complete line that is built from 3" to 21" gear centers in a wide variety of horizontal and vertical styles. Ratios from 3 5/8:1 to 6300:1 cover any application.

Send for our latest catalog WG-51 which shows complete details of the worm gear units. Please use your business letterhead.

Philadelphia Gear Works, INC.

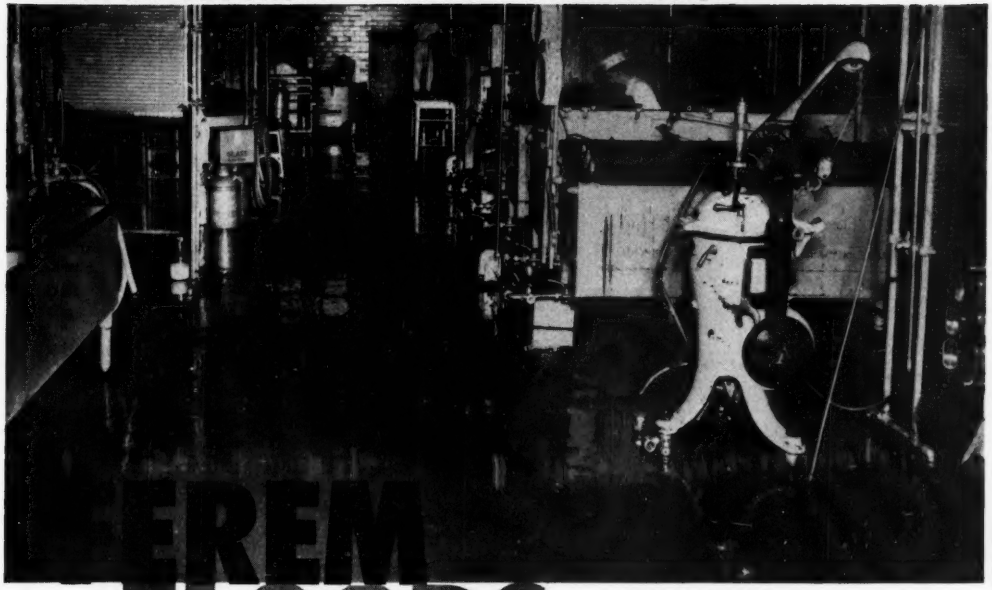
ERIE AVE. AND G ST., PHILADELPHIA 34, PA.

NEW YORK • PITTSBURGH • CHICAGO • HOUSTON • LYNCHBURG, VA.

IN CANADA: WILLIAM AND J. G. GREEY LIMITED, TORONTO

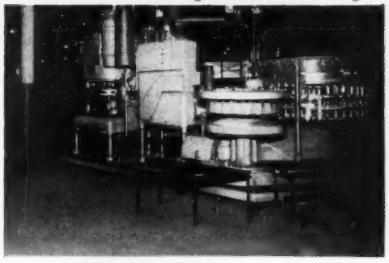
Industrial Gears and Speed Reducers
LimiTorque Valve Controls

TOUGH FLOORS FOR TOUGH CONDITIONS

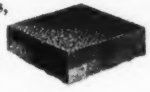


BLUE TEMPER FLOORS

Smith Dairy Products Co.
Bottling house of Miller Brewing Co.



In your plant you can have dense, ductile heavy duty floors, showing no noticeable wear for long periods and involving practically no upkeep costs, even when subjected to abrasive traffic and shock. Such floors are constructed with Ferem, the "Blue Temper" component in the floor topping, replacing sand, stone and silica. Ferem is used in heavy duty floors, loading platforms, corridors and runways in newly constructed buildings, or when replacing worn or eroded floors. Ferem is resistant to the corrosive action of chemical solutions . . . and has proven satisfactory under the wet floor conditions of many industries.



USED BY

Breweries, Beverage Plants	Chemical Plants
Distilleries	Industrial Plants
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HORN

A. C. HORN COMPANY, Inc. est. 1897

Manufacturers of materials for building maintenance and construction
LONG ISLAND CITY 1, N. Y. • Los Angeles • San Francisco • Houston
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FE-2

A. C. HORN COMPANY, INC.,
Long Island City 1, N. Y.
Please send me ☐ complete data on FEREM FLOORS
☐ free copy of your 96-page Construction Data Handbook

NAME_____ TITLE_____

FIRM NAME_____

ADDRESS_____

CITY_____ STATE_____

WESTINGHOUSE
Life-Line
DO NOT LUBRICATE
Life-Line motor
PAIRED FOR PRODUCTION
Life-Linestarter
WESTINGHOUSE

Cut motor failures with these two

Don't take our word for it. Here's what users of Life-Lines say: "We always have had bearing failures on our pump motors. It was quite an expense in repair costs and down time. Since we installed Life-Line motors, we have had no down time . . . no failures. We now standardize on Life-Lines."

Another user reports: "Our former starters employed solder pot mechanisms. Much trouble was experienced. Since we've switched to Life-Linestarters,® our troubles are gone. The operation of the bimetallic disc is positive."

These reports are two of several hundred such reports resulting from the new kind of dependability built into the Life-Line motor and Life-Linestarter.

Life-Line Motors

Steel frame . . . adds strength, cuts weight.
Pre-lubricated bearings . . . no greasing.
Improved windings . . . lengthen electrical life.

Life-Linestarter

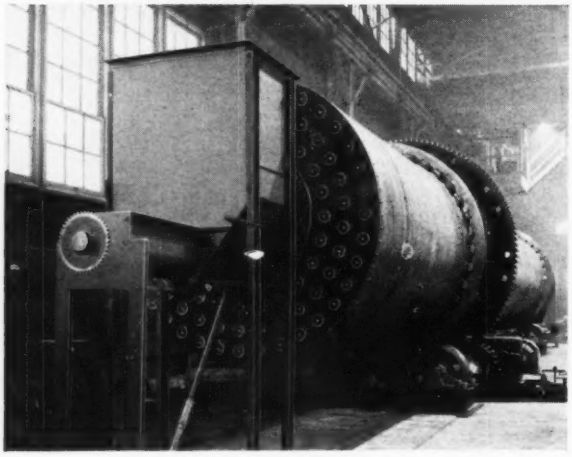
Bimetallic disc . . . calibration unaffected by aging or oxidation.
Servicing is simple . . . all parts front removable.
Screw driver only tool required.

Get the advantages of these two—your best bet to cut motor failures. Ask your Westinghouse representative for copies of "Life-Line Motor Book", B-3842 and "Tomorrow's Starter Today", B-4677, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-21644

YOU CAN BE SURE.. IF IT'S
Westinghouse
Life-Line
MOTORS and CONTROLS

New Dryer Requires the ACCURACY & UNIFORMITY of *Carpenter* Stainless Tubing

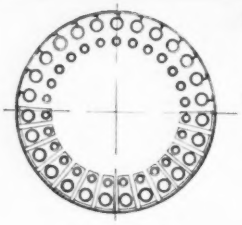


Modern food process equipment like this rotary steam-tube dryer has to *stay on the job.* You can't afford to interrupt a process for hours or days to replace tubes.

That's why—after considering several sources — this manufacturer's orders call for Carpenter Stainless Tubing. He knows that the quality standards we set at the mill will safeguard the quality reputation of his equipment.

Wherever food products are processed, Carpenter Stainless Tubing is used to safeguard product purity and product quality.

THE CARPENTER STEEL COMPANY
Alloy Tube Division, Union, N. J.
Export Dept.: The Carpenter Steel Company, Reading, Pa.—"CARSTEELCO"



Section At "A-A"

Cross-section view shows how Carpenter Stainless Tubing is arranged in concentric circles. Tubes in the inner circle are smaller diameter than outer tubes, to provide clearance and prevent lumps of material from wedging between tubes.

Carpenter

STAINLESS TUBING

—guaranteed on every shipment

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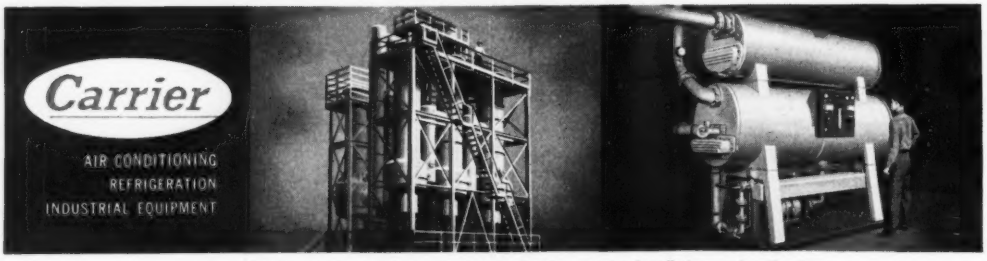

Illustrated above *(left)* is a typical Carrier Concentrator installation serving the citrus juice industry. For the refrigeration side there's a choice of three types — the Carrier Absorption Machine *(similar to that shown above, right)*, the Carrier Centrifugal Machine or the Carrier Reciprocating Machine — whichever will best balance your facilities.

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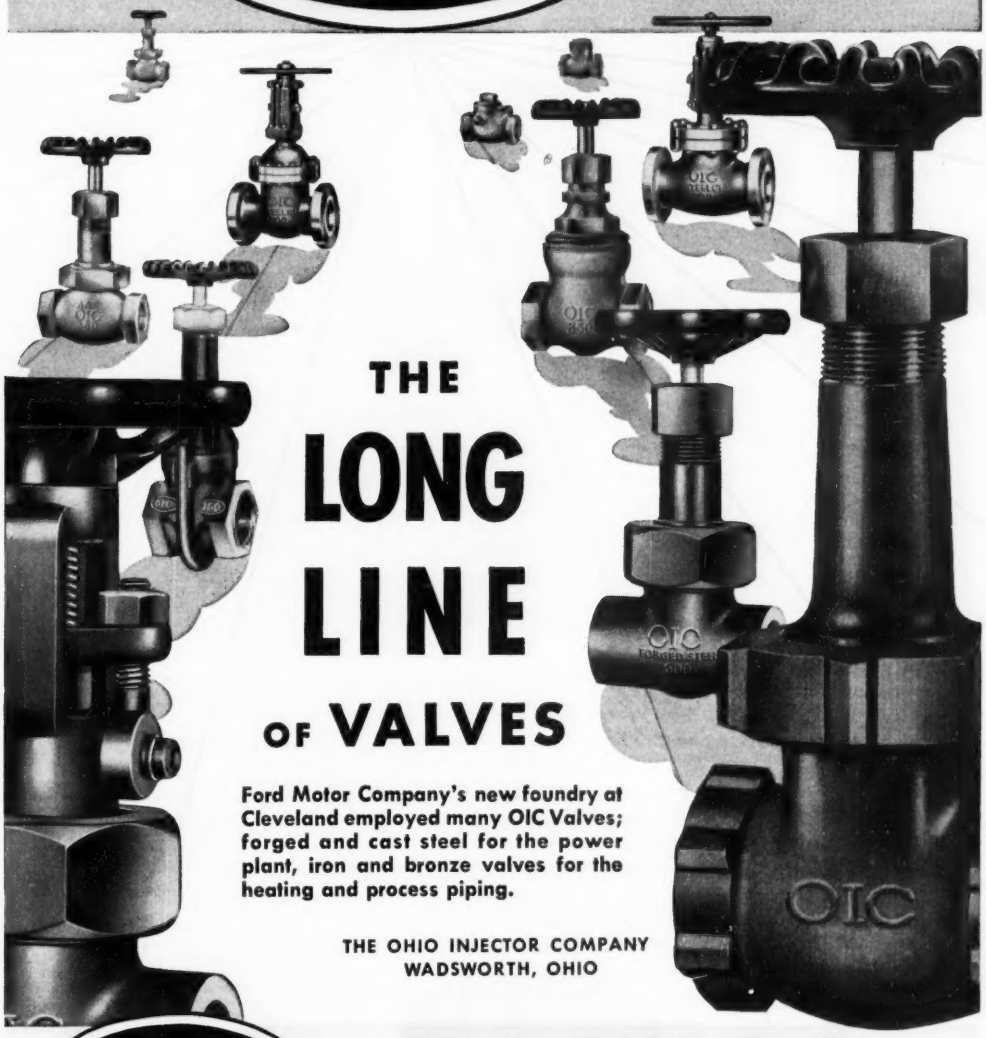

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*In addition to the H-2 Meter, other Beckman pH equipment includes completely automatic pH indication and control instruments for large-scale process applications . . . battery-operated models for complete portability in plant and field use . . . and a laboratory type instrument that features maximum versatility and accuracy for research and laboratory applications

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- **. . . better quality and flavor in a wide range of dairy processing and cheese making operations.**
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- **. . . improved sterilization, flavor and quality in various canning and preserving operations.**
- ***. . . and valuable savings in time and processing costs in many other food processing operations.***

If you have not yet investigated the savings Beckman pH Control can make in your particular food processing operations it will pay you to discover what others—possibly your own competitors—are doing to cut costs, improve quality and enhance flavor and marketability with the aid of Beckman pH Instruments.

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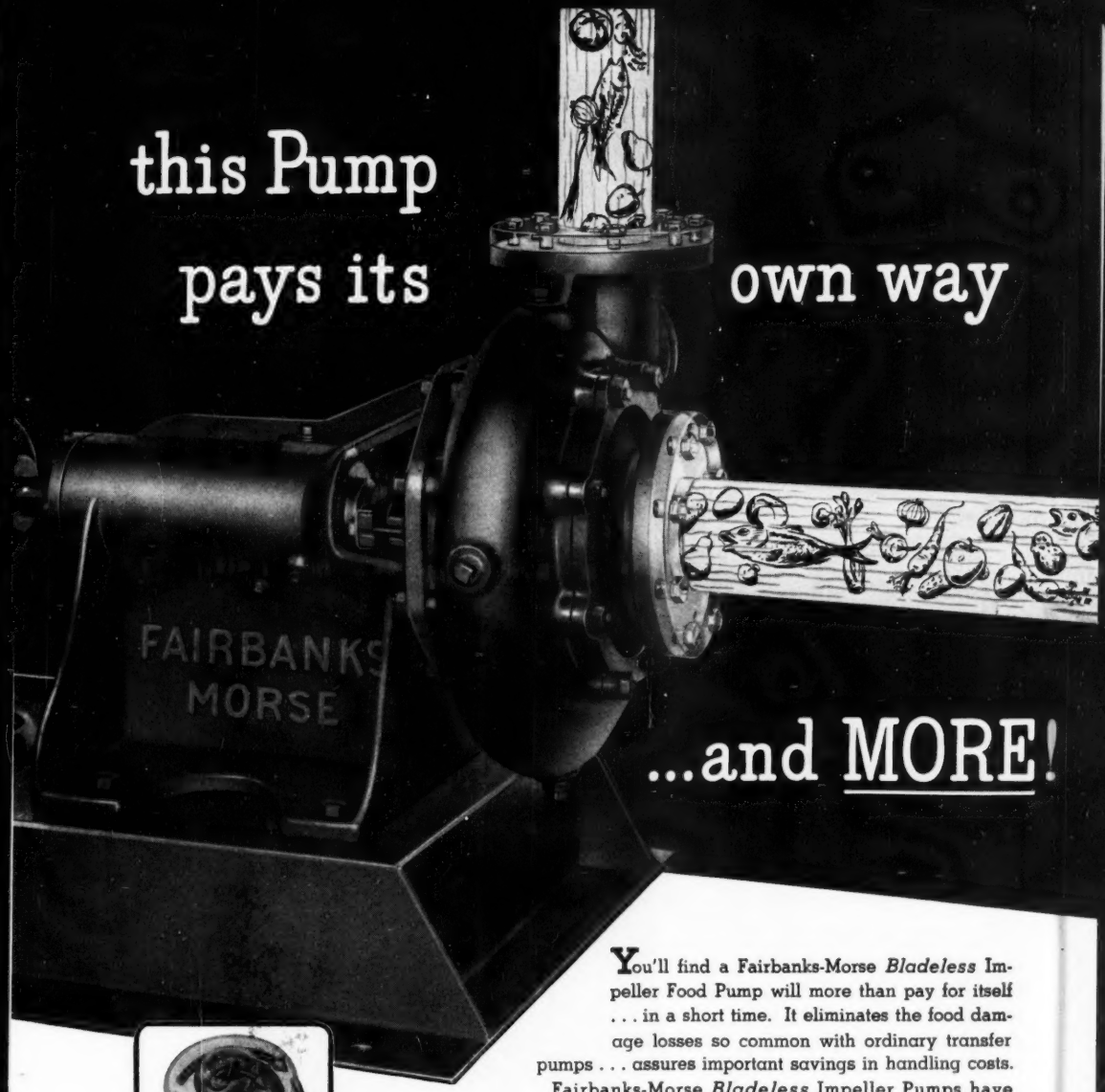

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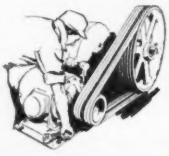

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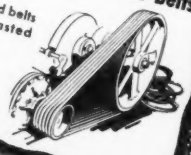

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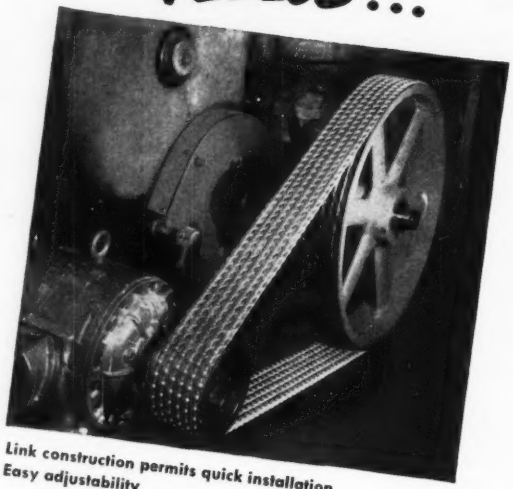

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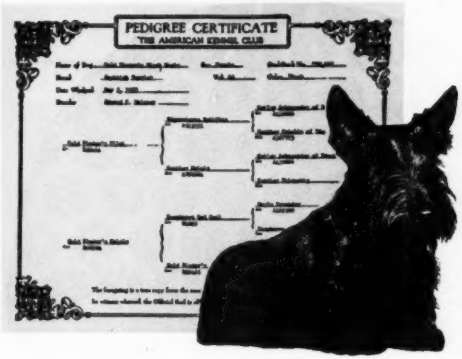

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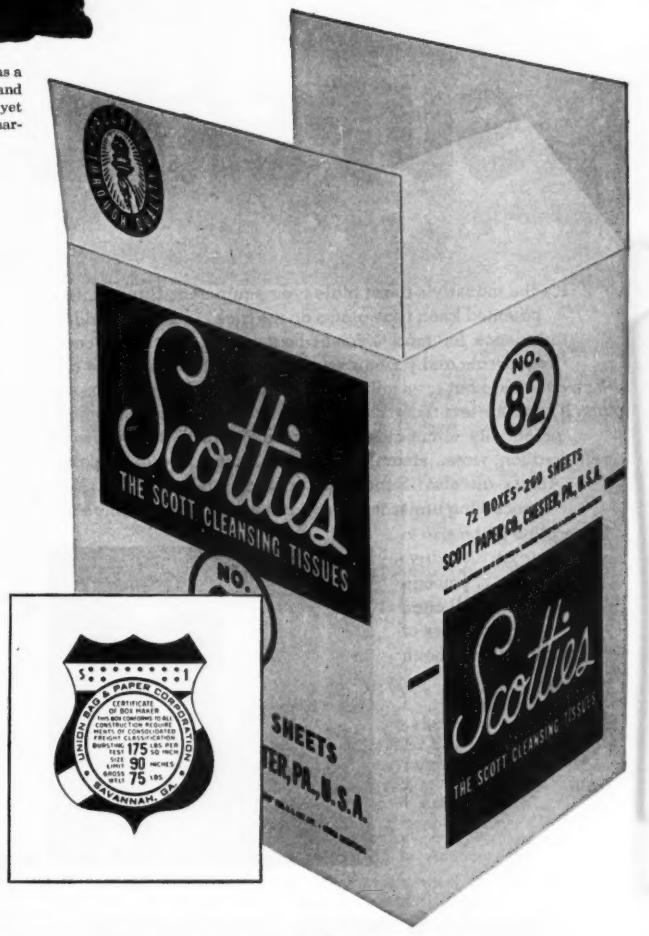

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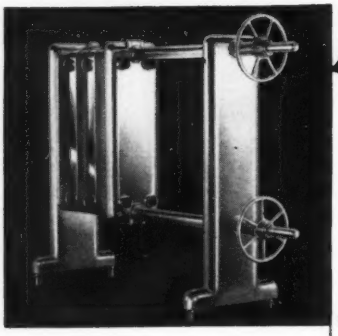

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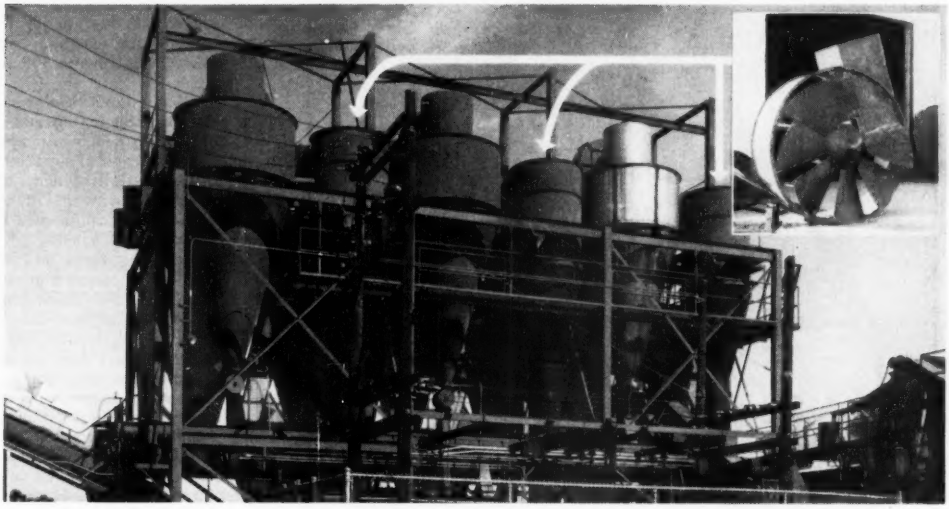


THREE-STAGE Air-Lift flash dryer, installed by large Florida canner, makes profitable pulp byproduct from waste citrus peel. Inset photo: Section of tower showing arrangement of adjustable radial baffles.

TOP-QUALITY DRYING
In a Flash

Many heretofore-theoretical advantages are at last being realized through striking new progress with speedy air-suspension technic

WALTER H. HARTE
Assistant Editor, "Food Engineering"

Flash drying is rapidly coming of age.

Sound engineering strides and bold management "go-ahead" decisions have accelerated the use of this increasingly important form of direct-fired drying in the food industry.

Materials, once thought too heavy or large for air-suspension flash drying, are now being handled with ease in the latest-model equipment. And today many previously unrealized drying advantages are being chalked up—

- **Higher yield with improved appearance of product**
- **Better nutritive-value retention**
- **Increased fuel savings and reduced maintenance costs**
- **Notable floor-space economies**

There have been, of course, limitations in the number of products that can be handled in flash dryers. Now, however, the range of applications is decidedly broader. At first, only fine particles could be processed. But today even large shreds of citrus peel are being efficiently dryed.

Flash drying and its big brother—spray drying—are not greatly dissimilar. The main difference is that a moist press or centrifugal solid-cake is fed to the flash, whereas a liquid solution is charged into the spray unit. The term "flash" evolves from the almost immediate removal—through evaporation—of a large fraction of the moisture in the damp solid. This occurs just as the feed hits the rapidly moving hot-air stream, which is used to convey (or suspend) as well as dry.

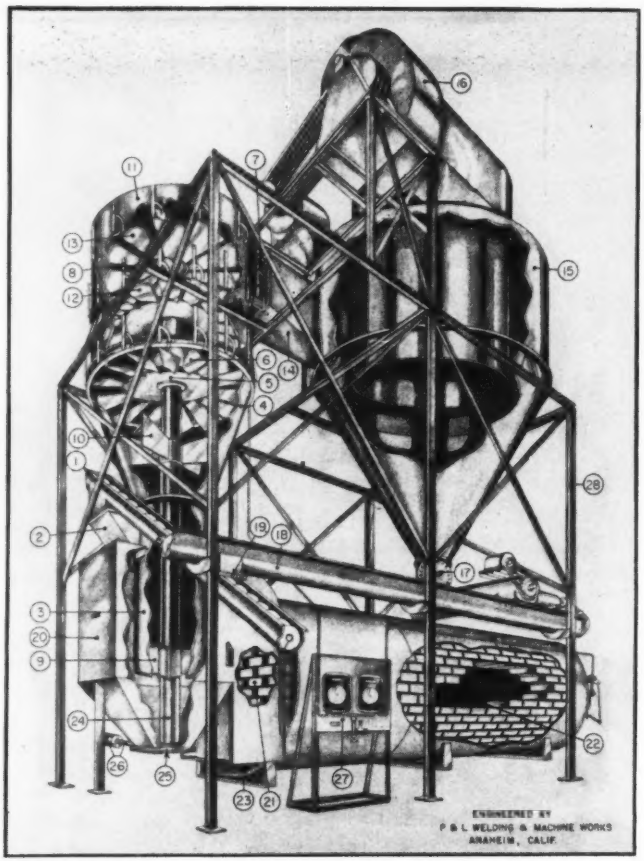
Normally, this air stream is heated with flue gases from an oil or gas-fired furnace—these streams being well mixed before entering the dryer proper. Motivation for the air is provided by a blower mounted between the flash unit and cyclone (used to separate the spent gases and product), or sometimes after the cyclone.

Wide Field of Application

In essence, most of the systems introduce feed through an air-lock of some type into a rising stream of rapidly moving, heated air, then through a riser, and finally into a solids-gas separator. There are many variations in design—depending upon vendor, product, moisture content, particle size and density, and material drying characteristics.

There are more than 30 commercial installations already operating or un-

Inside View of an Air-Suspension Dryer



ADVANCED, single-stage Air-Lift dryer. Rising screw conveyor (1) lifts feed to steep gravity chute (2) leading to tower venturi section (3). High velocity hot air sweeps feed into cone (4), where material is deflected by horizontal center plate (5) and adjustable baffles (6). Detention time is controlled by total air-flow louvers (7) and quadrant arms (8)—by which baffle angles are set. Fixed vertical baffles (9) and (10) regulate upward flow pattern in cone.

Immediately above cone may be seen tower's cylindrical section (11) with additional baffles (12) and (13). A rectangular tangent outlet (14), flush with dryer top, discharges air and material to cyclone (15). Exhaust air is pulled out of cyclone with blower fan (16), while material drops through rotary air-seal valve (17). Discharge conveyor (18) passes over feed conveyor so that dry material may be mixed into feed for conditioning through recycle gate (19).

Air chamber (20) receives flue gases from furnace (21) and (22) and outside air from duct (23), mixes them, then directs them into venturi. Center pipe (24) picks up large pieces too heavy to pass through tower.

At air-chamber bottom two purposes are served by hinged trap door (25) with counterbalancing rod and weight (26). Perforations in this door allow air to enter and sweep material into center pipe. And counterbalance provides for automatic dumping of any very heavy foreign matter, such as metal pieces or unsuitably conditioned wet-feed lumps.

Instruments (27) and supporting structure (28) complete unit.

der construction in the food industry today. A number of these are drying byproduct streams—such as fiber and gluten from corn refining, fish meal from fish canning operations, and citrus-pulp cattle feed from waste peel.

But others are handling products for human consumption—such as potato flour, corn starch, fish meal flour, and corn gluten.

Evaporation capacities in these plants range from a few thousand pounds per hour of water vapor all the way to the 30,000-lb. bracket. Inlet hot-air temperatures vary from around 1,000 deg. F. down to 300 deg. F. for heat-sensitive materials, with discharge heat levels between 300 and 160 F.

Products that do not lend themselves readily to flash drying include (1) those that are extremely heat sensitive or cannot be exposed directly to flue gases, (2) brittle materials, and (3) dense, large particles. On the other hand, those that can be used are bringing a full quota of benefits.

Shorter processing times and frequently lower air temperatures prevent much of the old product burning and scorching. Yields therefore can be upped, since burning of materials is minimized. Nutritional values are also conserved—their retention being a function of product temperature and time of exposure in most foods.

Air-suspending of particles overcomes the disadvantages where products were permitted to lie on hot metal surfaces—often causing case hardening, burning, and inefficient drying. In addition, some researchers have hinted at increased feed digestibility with the mild, even, flash treatment.

High Heat Recoveries

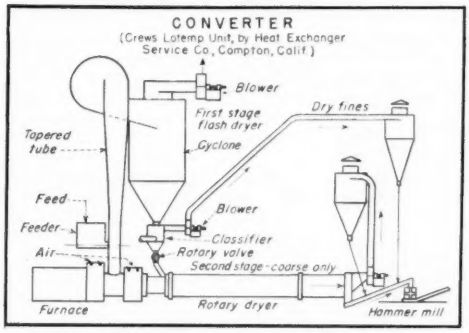
It is reported that heat efficiencies are running well above the average—70 percent and higher not being unusual. The intimate mixing of hot air with feed, exposure of the entire particle's surface to the moving stream, and constant solids-gas phase agitation, all contribute to this high figure. Also, recycling ducts may compactly be built into a flash unit to carry part of the exhaust air, boosting heat recovery even more.

Flash drying has been used in three instances as a specific means of minimizing smoke and odor nuisance—thus eliminating the exhaust problem often encountered. Foreign metal pieces, frequently found in feed materials, can be removed easily and surely in serveral of the flash designs. Continuous air-velocity controlled segregation does the trick without need for magnetic or electronic separators.

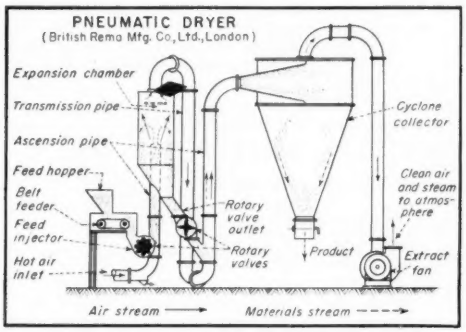
And maintenance costs are also being slashed due to the bare minimum of moving parts. A flash can boast of operating with just an air blower, feeder, and possibly a rotary air lock—without need for heavy trunnion drives and special air sealers.

Often the flash dryer is used in stages—two or three riser (or tower) cyclone combinations in series. Sometimes it is used preceding a rotary—this latter being a scheme to take

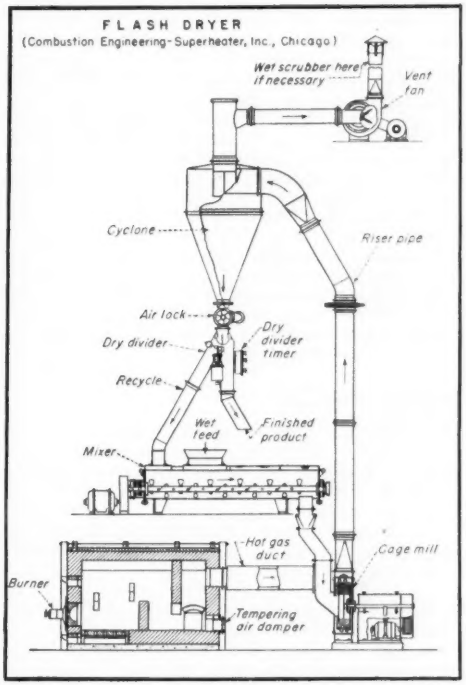
Three Other Types for Varied Application



IN THIS converter setup, tapered-tube flash unit is used as first stage in conjunction with rotary dryer. Furnace serves both flash and rotary dryers.



DOUBLE ENTRY is feature of British design. Feed hits moving hot-air stream at points below rotary valves.



RECYCLE timer may be adjusted for any percentage of dry feed recycle back to this dryer equipped with riser pipe. Cage mill serves to uniformly break up feed hitting furnace flue gases at base of riser to allow for maximum particle surface-exposure. Notched flights in screw-conveyor mixer provide rapid and efficient recycle blending.

A-B-C of Food Particle Drying

The drying of fibrous materials may more readily be understood by looking into the various stages a particle has to undergo before being termed "dry."

Generally, three distinct steps are involved—each identified at a specific moisture level for specific products. These are: A. The constant-rate drying range, B. The falling-rate period, and C. The diffusion stage.

A—CONSTANT-RATE RANGE

Here, the entire particle's surface is continually wet. This means that it's protected with a thin layer of water which immediately absorbs all heat directed toward it. And as this surface moisture is removed by evaporation, water from inside the particle quickly takes its place.

Product charring or degradation will usually not occur in this range—no matter how hot the atmosphere. This is due to the water layer around the food particle, which limits actual product temperature to the wet bulb range—normally a "safe" zone.

Most important constant-rate factors promoting quick and efficient drying without product degradation are: 1. Rapid entry of heat into the particle, 2. Quick removal of evaporated water so as not to stifle further evaporation, and 3. Maintenance of the thinnest water vapor film possible around the material.

Flash drying has been shown to be ideally suited for the constant-range—rapid heating being effected with the gases used to suspend or convey the drying particles, rapid movement of these gases purging water vapor from the system, and the same high velocities keeping the vapor film around the material thin. However, other factors, such as particle size, shape, and density, must be considered before choosing a drying system.

B—FALLING-RATE PERIOD

This represents a transition from the constant-rate range to the diffusion stage. Here, the surface is only partially wet—the above relationships still holding, but only to an extent equal to the wetted surface area. The dry part of the surface follows the rules that govern in the diffusion stage.

C—DIFFUSION STAGE

As the particle surface becomes completely dry, further drying can only take place by water diffusion from inside to out. Rate of diffusion controls this last stage. The factors influencing this rate are: 1. Particle thickness, 2. Particle temperature, and 3. Humidity of the surrounding atmosphere.

Longer drying periods at lower temperatures characterize this ordinarily-slower drying phase. Flash drying may be adopted to drying materials in the diffusion range—by using lower heat levels and possibly recycling both product and gases.

advantage of an existing unit (saving additional capital outlay), or being specified because of the particular drying characteristics of the product.

If an unusually long drying period is required to get the last traces of moisture from a material, the relatively short exposure time in a flash (even with solids recycle) may be unfeasible.

The Air-Lift dryer* (p. 58) is an example of one of the more advanced designs. For proper drying, a unique tower arrangement in this unit provides the necessary time lag between air and material velocity. The tower itself comprises a vertical venturi section, a tapered-upward cone, and a cylindrical top. Adjustable baffles and fixed air-deflection plates are provided in the cylindrical section to regulate and control flow through the tower.

Discharged When Dry

As the air-borne wet solids leave the narrow venturi, air velocity is gradually decreased because of the increasing area in the cone. The wetter (and heavier) pieces tend to jiggle up and down in this area until dry enough to pass into the top part of the tower. While little additional drying occurs here (a smaller time lag existing between air and material), the baffle plates tend to smooth out and distribute air flow through the entire tower —creating more uniform drying and material detention. Pitched baffles impart a spiral swirl to the stream in the top of the tower.

Most efficient drying is usually secured when air volumes and plate settings are such that a small percentage of the largest or heaviest particles return down the sides of the cone and venturi and drop to the bottom of the air-chamber (hot-air feeder duct). Three methods are employed to effect this action:

1. Installation of a small diameter center pipe extending from near the bottom of the air-chamber to the upper section of the main tower. This pipe—having a higher air velocity than the venturi—picks up the heavier portions and reunites them with the main product at the top of the tower.

2. Installation of a center pipe similar to (1) but extending through the top of the dryer. This is connected to a small separate fan and cyclone delivering the material for additional grinding.

3. Attachment of a bottom conveyor (just below the air-chamber) delivering material for grinding and redrying as needed.

* Made by P. & L. Welding & Machine Works, Inc., Anaheim, Calif. Other U. S. commercial units (as diagrammed in this article) are available from Flash Dryer Div., Combustion Engineering-Superheater, Inc., Chicago, and from Heat Exchanger Service Co., Compton, Calif.

Five principal adjustments provide flexibility to synchronize for load, moisture content, and particle characteristics:

A. *Air Volume* — Regulated by louvers in the tangent outlet of the dryer and usually placed under automatic control after the optimum volume is determined.

Thus, without load, the shutters remain nearly closed, but they open as the equipment builds up to full carrying capacity—louver resistance being replaced by material resistance to maintain constant air flow.

B. *Baffle Plate Settings* — Regulated by quadrant arms on the outside of the dryer shell and usually set between 20 and 35 deg. away from the horizontal.

At constant air volume, flatter settings provide less open area—thus giving increased velocity and material carrying power but less drying. Likewise, steeper settings provide more open area, decreased velocity, and carrying power, but greater cone detention time.

C. *Air-Chamber Louvers* — Manually operated and adjusted during preliminary operations to give optimum furnace draft while still providing entrance area for dilution air.

D. *Final Air Temperatures*—Measured in the dryer outlet duct.

Usual temperatures from the dryer are 150 to 210 deg. F. Under automatic control, inlet temperatures will vary with the evaporation load, but most units are designed to operate from 350 to 650 deg. F., depending on the product. Material remains at approximately the wet bulb temperature (110 to 140 deg. F.)—the units being designed to keep exhaust air well below the saturation point.

E. *Recycle Rate*—An adjustable recycle gate permits by-passing of finished product to a mixing conveyor.

A 100-percent bypass for the first few minutes to establish equilibrium carrying load is advisable. After this, a partial recycle may be desirable to condition high moisture feeds, increase evaporation capacity, decrease final moisture, or to maintain a constant load. The recycle gate may be tied in with the air-volume controller to accomplish the latter.

In all cases, recycled material should be mixed thoroughly with wet feed. In general, a partial recycle does not decrease capacity, since load carrying power is normally in excess of evaporation power.

Many Design Factors

It is evident that a single unit is capable of great flexibility to cover load and material variations. But when designing an air-suspension installation for a specific product under definite operation conditions, a number of factors should be considered.

The main ones are: 1. Relation of product weight and bulk to evaporation load; 2. inlet and outlet temperatures in regard to product quality; 3. the advisibility of additional stages of drying; 4. required air volume and tower cross-sectional areas for particle size, shape, density, and loading; 5. blower horsepower, speed, and static pressure; 6. tower height; 7. number of tower baffle plates and angle of setting; and 8. method of handling heavy or oversize material.

The following engineering details of the Air-Lift dryer indicate what actually takes place within a unit:

A. *Time*—Drying time is extremely short (1 to 6 min. for single stage, depending on characteristics of particle size, shape and density). Multiple units have total drying periods of about 2 min. for a 2-stage effect with finely divided buoyant particles, upward to 18 min. for a 3-stage effect with relatively large, less-buoyant particles.

B. *Material Suspension*—The product is completely suspended in air during passage through the dryer.

C. *Moving Parts*—Essentially, this dryer has only one moving unit—the blower fan which creates the necessary air volume and velocity to carry material through the system.

D. *Fuel Requirements*—The dryer may be designed to receive direct heat from a gas, oil, or coal furnace, or to utilize waste stack gases where available at sufficient heat and volume. Indirect heating—for example, passing air over steam coils—may be used when the air temperatures attained by this method are sufficient for the drying process involved. Generally however, heat requirements will range from 1,400 to 1,800 Btu. per lb. of water evaporated.

As an example, a plant processing 10 tons of raw fish per hour and producing 7,750 lb. of press cake at 51.5 percent moisture will use 37 to 40 gal. of fuel oil to evaporate 3,670 lb. of water and yield 4,080 lb. of finished product at 8 percent moisture.

At a heat value of 150,000 Btu. per gallon, the requirement in this instance is 1,500 to 1,625 Btu. per lb. evaporation. Where fuel cost is a critical factor, a saving can be effected by recycling a portion of the waste air and bringing the heat usage down to about 1,300 Btu. per lb. of evaporation.

E. *Air Volume and Power Requirements*—Since particle buoyancy varies greatly with shape, density and moisture content, it is essential that the dryer be designed for air volumes

(Turn to page 154)

Figures Tell Story of 92-Percent Cleanup

Average Sewer Loadings at American Maize
Before and After Waste Abatement Program

Source	1944 Figures: Volume (Gal. Per Day)	1944 Figures: Population Equivalent	Fall 1951: Volume (Gal. Per Day)	Fall 1951: Population Equivalent
1. Feed House Artery				
A. Feed house evaporator condensate	200,000	90,000	300,000	15,000
1. Due to entrained solids, 50,000 population equivalents				
2. Due to volatiles, 40,000 population equivalents				
B. Starch department—filter water	120,000	80,000	(None)	(None)
C. Oil refinery—deodorizer and wash water	1,200,000	10,000	(None)	(None)
D. Cooling water and miscellaneous	5,480,000	10,000	3,000,000	Negligible
Total	7,000,000	190,000	3,300,000	15,000
2. Refinery Artery				
A. Sugar and syrup evaporator condensate	200,000	40,000	250,000	5,000
B. Bone-char wash water	180,000	30,000	80,000	5,000
C. Miscellaneous process water	40,000	24,000	(None)	(None)
D. Cooling water and miscellaneous	3,780,000	6,000	2,200,000	
Total	4,200,000	100,000	2,530,000	10,000
3. Lactic Acid Artery				
A. Evaporator condensate	150,000	40,000	150,000	3,000
B. Spills and wash water	20,000	15,000	(None)	(None)
C. Cooling water and miscellaneous	3,330,000	5,000	3,330,000	Negligible
Total	3,500,000	60,000	3,480,000	3,000
Grand Total	14,700,000	350,000	9,310,000	28,000

Waste-Pollution Problem Solved

By Engineering the "Ounce of Prevention"

Midwest processor stops virtually all stream hazards, cuts water needs, and increases plant output—by getting at and rectifying causes, rather than installing more costly treatment facilities

E. M. VAN PATTEN and G. H. McINTOSH
Research Department, American Maize-Products Co., Roby, Ind.

Disposal of plant wastes poses a large and serious problem—quite often aggravated by the inherent hazards of operational proximity to large population centers.

Back in 1944, American Maize-Products Co., adjacent to Chicago and one mile south of Lake Michigan, was forced to do something about the waste streams discharged from its wet corn milling operations.

Rather than resorting to elaborate sewage pretreatment and disposal methods, we employed elimination and recovery technics. As a result, the company made these notable gains:

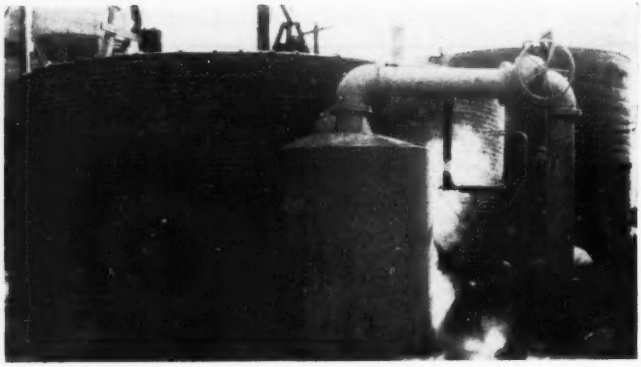
- **Reduced its daily outfall-sewer pollution loading by fully 92 percent (from 350,000 population equivalents down to 28,000).**
- **Cut its raw water requirement by 25 percent.**
- **Increased overall plant corn-product yields by a full 1 percent.**

And these advantages were gained at less than one-quarter the capital investment of building a treatment plant to stabilize the wastes—not even figuring the additional operating costs which a treatment plant would entail.

The program was keyed by (1) isolating all waste bearing water, (2) reuse of process water, (3) recovery of all solids possible, and (4) reduction of considerable organic volatile matter.

Basic to the success of our big un-

RESEARCHER carefully analyzes the various stream samples to determine extent of Maize's waste problem.



COLLECTING WELL for plant-waste waters provides means for measuring volumes dumped into Lake Michigan. Meters and automatic samplers were placed on all lines feeding this sump.

dertaking was a thorough evaluation of the problem by checking controlled waste streams. Our practices at variance with those of other processors proved not as hazardous to product quality as once thought.

The extra care in control in waste abatement proved a distinct asset. All plant operations now run more smoothly and under more uniform conditions. The plant worker has been well informed throughout all the changes and has consequently developed a genuine interest.

Getting Program Underway

When starting we realized we must put these plant trade-wastes under critical surveillance: 1. Refinery bonechar wash water from the sugar and glucose bleach tanks, 2. Condensate from the many multiple effect evaporators (carrying entrained solids), 3. Starch filtrate water, 4. Excess process and floor washing water, 5. Spillage and occasional failure of equipment, and 6. Oil refinery operations.

Due to the fact that our operations depend heavily upon slurrying, steeping, and washing, tremendous amounts of water are needed. Prior to our program, plants requirements were 15 million gallons of raw water daily—both for processing and cooling. The company drew this water from Lake Michigan and sewered back spent cooling waters plus those not completely utilized in process.

In January 1944, an extensive six months' study of all plant industrial wastes was initiated to classify the pollution load of the total industrial waste according to all sources. Basic physical, biological, and chemical characteristics of the individual loading factors, as well as magnitude and hourly, daily, weekly and seasonal fluctuations were carefully established.

It was absolutely essential to obtain this data before a plausible plan for reducing the overall loading could be established. Today, the company feels that the success of the program fundamentally resulted from the exactness of this survey, which was carried out by a unit of trained personnel within our research department.

The plant is served internally by two active sewer systems and one emergency system, as follows:

1. Hammond system for sanitary sewage and some industrial waste.
2. Lake Michigan system for cooling waters and some water bearing negligible bio-loading.
3. A 10-acre lagoon, used to protect the regular systems from shock loads in event of gross equipment failure.

In 1944, the systems were arranged so that trade-waste loading could easily be diverted from one system to the other by diversion chambers. All sanitary wastes were isolated so there was no possible way for their disposal into the Lake Michigan system.

Sewer Systems Surveyed

All Lake Michigan discharge waters are collected in a large well within plant properties and then pumped to the lake. This system handling the bulk of the outgoing plant water comprises three main arteries from these sources:

Glucose refinery—Cooling and condensate waters from corn syrup and sugar vacuum-concentrating pans, bone filter wash and tempering waters, and floor wash water and waste from refinery process equipment.

Feed house—Cooling and condensate waters from steep water and process water evaporation pans, starch filter, vacuum-pump seal waters and manufacturing water heat-exchanger condensates, and oil refinery vacuum-deodorizer downleg waters.

Lactic acid section—Cooling and condensate waters from vacuum concentrating equipment, wash water, and cooling water from dextrose and corn syrup solids department, boiler-house cooling and blowdown waters, and water treatment plant filter backwash water.

Following establishment of the basic components of the Lake Michigan system, it was possible to start collecting data to obtain the actual loading picture. Automatic sampling devices were installed on each of these three main arteries as well as all possible waste contributing lines and equipment, no matter how isolated. Volumes were also determined for all effluents.

All samples were representative 8-hr. shift composites. Automatic sampling devices were initially checked against several series of half-hour composite grab samples for performance before the samples were used routinely. This check has since been made standard practice.

With this data, the company found that solids entrainment of existing evaporation equipment accounted for about 40 percent of the total load. Volatile matter in waters concentrated in the feed house were noted to average 0.4 percent by weight—these volatiles, made up of organic acids, esters, fusal oil, furfurals, aldehydes, and ethyl alcohol, comprising about 12 percent of the total load.

Process and starch filtrate waters made up another 25 percent. These come from the chemical processes (all requiring individual study as to solids recovery and waste control) used to produce many of American Maize's specialty starch items.

As a result of this study it was decided to reduce overall loadings—(1)

By rebuilding or replacing evaporators contributing to entrainment; (2) isolating condensates from cooling waters; (3) installing new starch filters to cut down on wash water; (4) devising means for limiting bone-char wash water; and (5) eliminating sewering of excess process water by re-use or evaporation.

Conversion factors were established between solids concentration in the waste waters and equivalent biological oxygen demand (B.O.D.). It was found that 17 ppm. of glucose solids possessed a B.O.D. of 5 ppm. and 17 ppm. of steep water solids 14 ppm. B.O.D.

With these fundamentals in mind the company determined that if all plant vacuum concentrating equipment could be operated to maintain an efficiency of not more than 170 ppm. solids entrainment, then the entrainment losses would have a negligible effect on cooling waters discharged to Lake Michigan.

On such a basis, solids carryover resulting from syrup refinery operations would result in a corn syrup solids loss of from 150 to 300 lb. daily.

The Zaremba evaporator people proposed the fabrication of custom-made vacuum pans. In these they would guarantee to meet the 170 ppm. entrainment maximum under every-day operation. And on the basis of this guarantee, the company felt the problem could be solved by the following disposition of waste waters:

Lake Michigan sewer system—Eliminate all waters bearing organic and inorganic solids from this system, except traces of sugar solids not possible to separate from refinery cooling waters. The only waters sewered back to the lake would be those used for cooling purposes.

Hammond municipal sewer system—Release here only such low-solids bearing bone wash waters as were found impossible to re-use in the process (not exceeding a loading equivalent of 2,000 to 5,000 people).

Also dump all condensates from feed-house evaporation operations—but only after partial treatment limiting bio-loading to a figure amenable to the Hammond municipal activated sludge plant.

Limit waters sewered to Hammond to a maximum of 600,000 gal. daily with a total bio-loading not to exceed 14,000 population equivalents.

The company started an intense rebuilding program late in 1944 to meet the above proposals. Briefly, by department, the following engineering and equipment changes were made.

A—Refinery

1. Installed new triple-effect evaporating pans for light glucose liquors and light sugar liquors.

2. Put in new heavy liquor finishing pans and rebuilt all remaining concentration equipment to conform to 170 ppm. maximum solids carryover.

3. The condensates from all first and second effect triple-stage pan vapors were re-used in the refinery system to replace fresh water for bone wash water. The company thus conserved fresh water and eliminated heating costs necessary with the fresh water.

4. Re-used 10,000 gal. of bone wash water for washing refinery filter presses.

5. Filtered 60,000 gal. of bone wash water daily, and re-used this as starch wash water in making glucose.

These refinery changes increased the overall evaporating capacity by 25 percent, but reduced the cooling water draw to 2,200,000 gal. daily—a 50 percent reduction over old equipment. Also bone wash waters were cut through 60 percent re-use.

B—Feed House

1. Installed a new stainless steel triple-effect, continuous evaporator with 320,000-gal.-per-day evaporating capacity. This pan was equipped with a surface condenser.

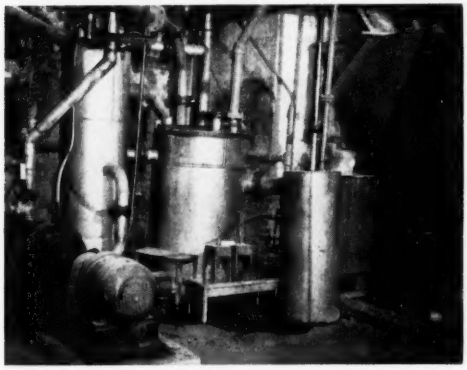
2. Set up a new single effect finishing pan equipped with surface condenser.

3. Renewed existing double-effect pan for stand-by operations.

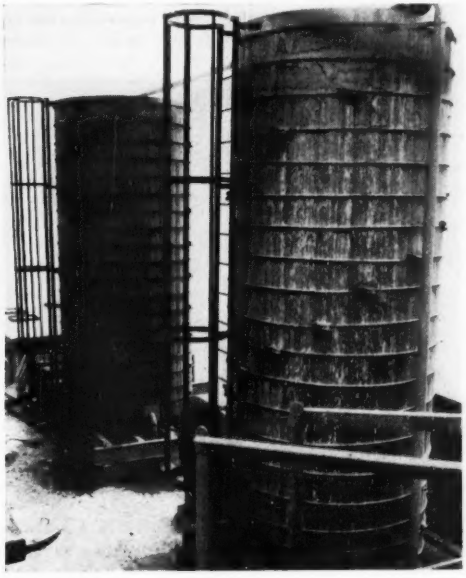
This program increased the feed-house evaporation capacity by 52 percent and resulted in a better than 50 percent reduction in the amount of cooling water used.

C—Lactic Acid Department

1. All evaporator pans were replaced with new units.



PUMP (left in photo above) transfers feed house condensates to top of air scrubbers. Effluent then goes to diversion chamber (center) and is neutralized with lime from feeder (right).



THESE air scrubbers (→) reduce B.O.D. in feed-house evaporator condensates by 53 percent. Volatile organics in the incoming water are driven off by 25,000 cu. ft. per min. of air bubbling up through each unit.

2. The process waters were collected and re-used where feasible.

D—Process Water Department

Like the rest of the companies in this industry, we are using a recirculating process water system. In this system fresh water enters the plant on the filters washing the starch. The filtrate water from these washes are worked back through the system and leave as concentrated steep water.

This water balance requires very careful control to avoid large excesses, which cannot be economically evaporated. Also, the separation of starch from gluten is dependent upon this balance, as is the quality of the finished starch.

After considerable research, we were able to eliminate all excess starch filtrates and process waters from the sewers by these procedures:

1. Installed two large string filters for starch washing. This eliminated 100,000 gal. of filtrate water daily and made it considerably easier to effect a process water balance.

2. Starch filtrate water replaced fresh water in the wet-dust-collecting system.

3. Special starch filtrates formerly considered harmful to the wash-water system are now partially re-used.

4. A large special starch filtrate holding tank was constructed to slowly meter those filtrates harmful to the system to feed-house evaporators.

5. New treatment methods were developed for the production of special starches. These methods do not yield filtrates containing salts harmful to animal feed.

6. Careful scheduling of all special starch processing is practiced and is absolutely essential.

7. All streams were metered.

8. Starch filter vacuum-pump lines were equipped with a fool-proof catch-all system to prevent intermittent priming. This eliminated occasional shock loads of starch filtrate water to the Lake Michigan system.

E—Volatile Loading

Two air scrubbing units were put into operation to reduce volatile load-

(Turn to page 153)

Ingenious Sampling Unit—Continuous, Automatic

Getting the numerous samples required to check the waste streams at American Maize was no easy task. Special samplers had to be rigged up to insure accurate composites for the lab analyses.

Small electrically driven pumps withdrew a continuous small stream from each of the liquid lines being investigated. This stream was then fed to a homemade-automatic sampler to further reduce its volume—and still be representative.

The sampler exterior is a stainless steel box 7 in. square and 6 in. deep, standing on 12-in. high legs. Suspended in the box is a V-shaped trough 6 in. long, 2 in. deep, and 5 in. wide. This trough is divided lengthwise and is counterbalanced by a weight attached on the outside.

A ¼-in tube is welded in the center of the trough in a vertical position. It is directly above a similar sized tube welded in the bottom of the box. Water from the sampler pump is introduced through a pipe located in the cover.

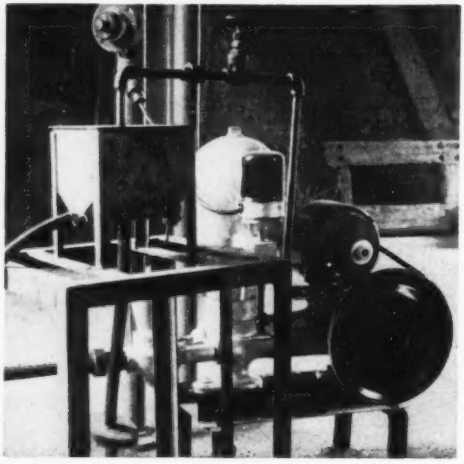
As one side of the trough is filled, it tips, allowing the water to run into the other half. During this wobble the vertical pipe in the box passes through the stream of water, and a few drops will run through it into the sample bottle below the box. Excess water runs out a side tube.

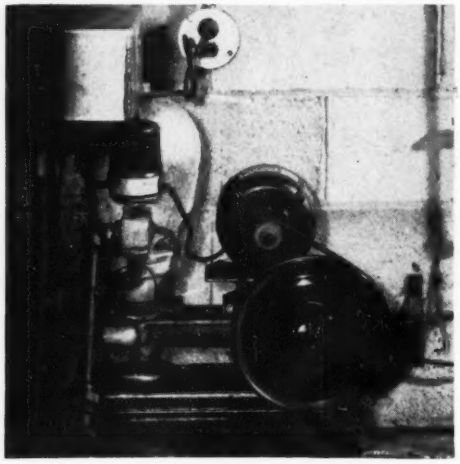
The flow of water to the sampler is regulated so we collect about a ½ gal. sample per shift.

On the evaporators, a ¼-in. copper pipe is inserted in the path of the vapors leaving the evaporator. The small amount of vapors collected is condensed by a water jacket on the collecting tube. Thus a continuous dripping of condensed vapors is collected in 1-gal. vacuum flasks.

All samples (approximately 30 in number) are collected at the end of each shift and analyzed by shifts. Thus we not only can tell which piece of equipment is faulty but also can check with the specific operator.

We run 5-day B.O.D.'s as outlined by the American Public Health Assn. These are periodically checked by a municipal sanitary laboratory. In addition to the B.O.D.'s, we check the total and soluble solids, pH, reducing sugars, and protein by 8-hr. shifts. These tests are also those outlined by the American Public Health Assn.





CLOSEUPS of typical continuous samplers used by Maize Company to get accurate specimens of waste waters. Note each has stainless steel box just above and to left of sampler pump. Inside are V-shaped wobble troughs.

AUTOMATIC loading device shoves row of pies into traveling oven. Pusher bar (A) rides on upper and lower tracks (B).

Mechanizes for Greater Efficiency

By engineering eight changes accenting advanced equipment and technics, pie baker saves labor and materials, improves quality, avoids delays

DON F. COPELL
Vice-President, Engineering & Training Div., Wagner Baking Corp., Newark, N. J.

Advances in our unit operations have brought about significant increases in productivity. And these changes have also enabled us to improve quality of our products and reduce the number of "cripples".

By keeping in step with industry achievements and by streamlining our operations accordingly, we have rung up eight distinct improvements.

1. Savings in time and labor have been attained through the use of an efficient system of delivering flour to the storage room, adjacent to the blenders serving our pie-making operations.

2. Feeding of apples to the newly installed 4-spindle peeling and coring machines is now simplified, with the new units handling one-third more apples than the former 3-spindle peelers and corers.

3. Company-designed units have been installed for rapid cooling of fillings.

4. Coconut custard fillings are fed through the quick-opening of a manually-operated pipe into pastry shells in a revolving oven. And toppings are squirted on pies by means of a special pressure filler.

5. A divider, with a twin-compartment supply hopper, cuts lumps of dough for top and bottom crust.

6. Speed-up has been attained through use of a volumetric filling machine for feeding fruit fillings into unbaked pies.

7. A simple loading device automatically shoves rows of pies into a traveling oven.

8. Pies loaded on racks are now quickly cooled in an air-conditioned room for speeding production, saving floor space, and curbing cripples.

How each of these advances contribute to our operations will be brought out in the following account covering our pie-making at the Newark plant. And in the course of this description other earlier improvements will be touched upon.

A Complete-Process View

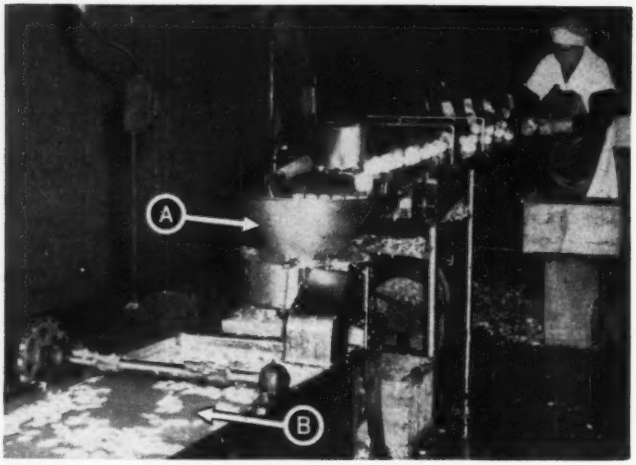
—graphically detailing advances engineered into pie-making operations will be found in this month's FE Picture-Flowsheet, titled "Producing Top-Quality Pies." Diagrammed over the four foldout pages is the full operation, keyed with closeup photos that "spot" major operations. **Turn to p. 120.**

1—Efficient Flour Handling

Installed was a time- and labor-saving handling system for delivering 100-lb. bags of flour to a separate storage room, away from production areas. Movement of bags from receiving dock to the 3rd-floor storage room is by means of a 100-ft., friction-type, rubber-belt conveyor. Formerly, the bags were transported by freight elevator and lift truck.

With the present system, approximately one-third of the original handling time is saved. What's more, only

Peeling Line That Stepped Up Output



PEELED and cored apples are conveyed to automatic slicing machine (A). Slices travel through brine tank (B) on their way to rotary screen.

two men, instead of four, are now required to do the job. The two employees saved from the former heavy work of flour-handling have now been trained to carry out the duties of inspectors and sanitarians—a change further safeguarding product quality.

Storing of flour in an air-conditioned room is another quality-promoting measure. By keeping this room at 65-68 deg. F. and a relative humidity between 70-75 percent, variations in the temperature of pie dough going into the oven are kept at a minimum. As a result, baked pie crusts are more uniform in texture and appearance.

Flour dust is confined by carrying out the dumping operation (feeding flour from opened bags into blenders) in a separate room. Varying lots of flour are mixed according to desired ratios (up to 7-1) by making adjustments on horizontal worm screws in a twin-compartment blending machine. Capacity of the unit is 20 bbl.

To assure production of more uniform quality doughs, the water is filtered and chilled to 34 deg. F. Chilled water is then metered into mixing bowls, in which lard, shortening, and salt have been scaled.

2—High-Speed Peelers

Speedier output in our apple-trimming operation has been attained through the installation of 4-spindle peeling and coring machines.

Each new 4-spindle machine peels and cores 90 apples a minute—30 more than the former 3-spindle unit. Another advantage of using the new machines is the ease with which operators can now supply apples to them. The former task of feeding apples with both hands to the 3-spindle peeler—a catch-as-can method—was awkward and confusing. But with the present machines, each operator uses balanced motions and delivers two apples at a time to cups below the spindles, without any criss-crossing of her hands.

Now to the steps in the preparation of fruit fillings—blueberry, cherry, and pineapple:

From 30-lb. tins, frozen fruit is dumped into three specially designed steam-jacketed kettles, with a stainless steel exhaust hood and fan installed over each for removing steam. Instead of extending part-way up the kettles, the steam jacket reaches the top lip—a design feature that assures uniform cooking without burning or sticking of the filling onto the kettle.

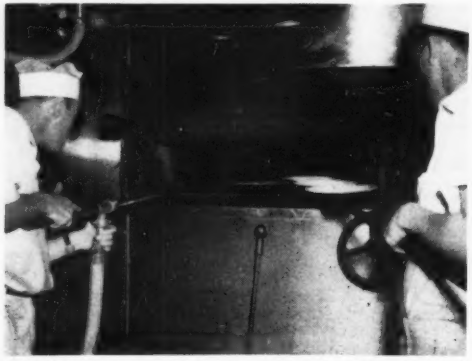
Liquid sugar is metered into the kettles, and starch, spices, and other ingredients are added. Batches are cooked about 25 min. at 190-205 deg. F.

3—Unique Pie-Filling Cooler

Rapid cooling of the filling—a notable improvement—is now achieved in three Wagner-designed, stainless steel, double-jacketed coolers, each holding 1,000 lb. These units are 4 ft. in dia. and 10 ft. high, and they provide 100 sq. in. of cooling surface per pound of filling.

Each cooler has a vertical worm screw—the agitator. Attached to it are four 1-in. dia. vertical rods, each containing six flexible scraper blades. As the central worm screw and scrapers

Advanced Custard and Cream Filling



SPECIAL unit comprised of supply tank, hose pipe, and check valve, is employed to feed custard filling into baked pastry shells within revolving oven.

PRESSURE FILLER squirts topping cream under 40 psi. on special pies. Unit is equipped with plastic feed-hose and trigger operated discharge valve.

revolve at 12 rpm., the filling is agitated and cooled. Well water is employed as the refrigerant.

An hydraulic lift lowers each cooler below the floor. Fruit filling is then gravity-fed into the coolers from the cooking kettles. Filling is emptied from the kettles by opening slidegate valves directly above the swivel-type troughs feeding into the coolers.

After a cooler is charged, the hydraulic lift raises it about 6 ft. Cooling of the fillings from 190 to 70 deg. F. takes 45-60 min., depending upon the temperature of the well water.

From the raised position, the cooled filling is emptied into aluminum tubs, each holding 125 lb. Tubs are protected with metal covers that keep out foreign matter and which also permit double-stacking on push trucks. Fruit filling is now ready for the bake shop.

Other advantages of this rapid cooling process: (1) Chances of contamination by microorganisms are eliminated, (2) considerable floor space is saved, and (3) control over production is simplified.

Formerly, fillings were emptied into tubs, which cluttered up most of the space on the kitchen floor. And as they cooled overnight, contamination by microorganisms was a risk. Also, this cooling procedure required a large inventory of tubs. And the more tubs used, the more time was lost and the more labor was required in handling and washing them.

Another thing: Our former cooling system did not assure a close control over production. This we now have. Today, cooling takes less than an hour. And we are no longer stuck with a kitchen full of fruit fillings when faced with a sudden drop in demand due to adverse weather or the like.

Fillings of the pumpkin, lemon, and chocolate custard type are run off in the same manner as the fruit fillings just described. These now go directly to filling machines that automatically deposit them into unbaked pastry shells coming from pie-making machines.

Formerly, these shells were first baked in a revolving oven, and the fillings were then hand-poured into them —a costly, time-consuming operation.

4—Special Filler

Through flexible, plastic hoses we deposit our fillings. These hoses are attached to company-designed fillers, each comprising a 1½-in. dia. and 8 ft. long pipe that can be inserted in an oven. By merely pressing and releasing a trigger, a spring-operated check valve at the feed end of the pipe is opened and closed. The operator easily guides the pipe in feeding filling into the baked pastry shells.

Cream topping is filled into a 300-lb. capacity, stainless steel, caster-mounted enclosed tank. This topping machine, built according to our specifications, squirts the cream onto our special pies under 40 psi. This filler is equipped with a plastic feed hose and trigger-operated discharge valve.

It is also used for introducing 200-deg. F. apple juice into pies after they have been "peeled" (removed) from a traveling oven and loaded onto racks.

Let us now go back and pick up the progressive steps taken to mechanize pie-crust making operations:

5—Dual-Purpose Divider

Dough is fed into a company-designed stainless-steel divider via a twin-compartment supply hopper—one for dough used for the top crust and the other for dough for the bottom.

From the hopper, the dough drops between a pair of corrugated horizontal rollers that force it through two 6-in.-dia. dies. Next, a revolving wire cutter snips pieces of dough extruded through the dies. Speed of the cutter can be adjusted to form pieces of dough weighing 1 to 36 oz. Capacity of the divider can be regulated to the speed of the pie-making machines, which turn out 20 to 28 top and bottom lumps of dough per minute.

6—Mechanical Pie Filler

Appreciable savings in labor, and improvements in the efficiency of introducing fruit fillings to the pies, have resulted from the use of a high-speed filling machine that we had fabricated to our specifications. This automatic, volumetric machine now does the work formerly performed by two employees who employed the sloppy hand-dipper technic. Other advantages derived from this machine are reductions in spillage, less overfilling, and fewer slack fills.

Comprising the automatic filler are a 200-lb. capacity stainless steel hopper and a volumetric filling unit. The machine fills four 10c. pies at a time. It is set to handle 112 pies per minute.

Next step is removal of the trimmed pies from the multiple pie-plate molds, and then transfer onto a metal slatted conveyor going to the oven. The transfer is accomplished by a short chain-driven series of horizontal metal bars mounted over the conveyor carrying the pie-plates through the pie-making machines. Attached to these horizontal bars are vertical prongs that push the straps of pies off the pie-plate molds and onto the conveyor to the oven. At the transfer point, the conveyor under the pie-plate molds makes a complete loop, for return to the pie-making machines.

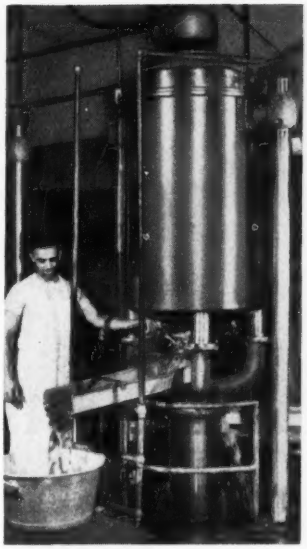
A striking aspect in the pie-making line is flexibility. One mechanic, by making simple changeovers on pie plate holders, filler, and trimmer, can set the line up to handle 4, 8, or 9½-in. pies.

7—Automatic Oven Loader

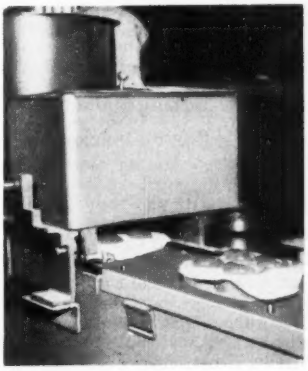
High efficiency is achieved with an automatic loading device that feeds

(Turn to page 161)

Pie Filling Changes

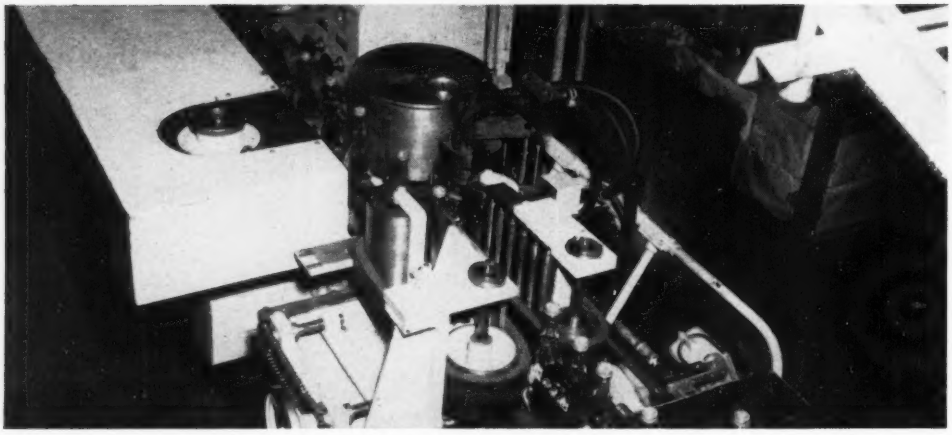


DOUBLE-JACKETED cooler chills the 1,000-lb. batches of filling within 1 hr. Hydraulic lift raises and lowers unit for loading and unloading.



SPECIAL volumetric unit automatically feeds fruit fillngs into pies at rate of 112 per min. It saves two employees.

Fast-action unit automatically applies . . .



COMPACT machine can put heat-activated labels on containers at 300 a minute. Seen is an Eastern installation.

High Speed, Simplicity With Thermoplastic Labeling

Heat-activated labels go on jars and cans—firm and clean at rates hitting 300 a minute. And superior, smear-free labeling is achieved on flexible packages . . . Users point to savings both in labor and in space

IVAN C. MILLER
Assistant Editor, "Food Engineering"

Four years of accumulated experience applying labels to a wide variety of food packages, both rigid and flexible, without glue or water soluble adhesive, has established these advantages for a relatively new type of thermoplastic, dry-labeling operation:

1. Firm "paper-splitting" adhesion and clean packages—labels do not curl, or fray at edges, and there is no glue or paste to smear label or container.

2. High-speed operation on rigid containers—at such rates as 300 glass jars or cans per minute—and rapid mechanical changeover of either label or container.

3. Low labor and maintainance cost and also reduced floor space requirements.

The adhesive layer on the thermoplastic dry labels may be either one of two general types. Both are non-tacky until they are heat activated, and both can be brought to application temperature, either through the paper of the label or directly by heat contact against the adhesive itself.

One type of adhesive material loses most of its tackiness the instant the label is removed from the heating element. When this type adhesive is used, results are most satisfactory when the transfer of the label from the heating element is directed to the package. Therefore, this is the kind of label which is usually applied to flexible packages, such as those containing meat products, frozen foods, candy, and cereals.

The other type of adhesive remains in a tacky state for several minutes after it is heat activated. Labels backed with this adhesive, which is characterized by a delayed action set, are the ones most suitable for high-speed machine labeling of all foods packed in tin cans, bottles, and jars.

Let us observe several high-speed-machine applications and note the advantage reported by food plants in which this thermoplastic labeling has been established a year or more.

Labeling Glass Jars

In one Midwest plant, where labels were applied by water-soluable adhesive to glass jars, each of the four machines in the original labeling assembly operated at a rate of 50-90 label applications per minute, depending on the type of container. (It may be noted here, however, that wet labelers are available with sustained speeds of 140-160 per minute.) One operator was necessary for each pair of labelers in the plant.

Now, since the changeover to the thermoplastic system, one machine with a speed of between 260 and 300 labels per minute has replaced the four units formerly required.* And only one attendant is necessary

* In this new operation, Nashua Gummed & Coated Paper Co., Nashua, N. H., supplied the labels, while the machine was designed and manufactured by the New Jersey Machine Corp., Hoboken, N. J

. . . broad variety of bright, modern labels . . .

SAMPLES of various thermoplastic labels applied in high-speed operations. Note many sizes and shapes handled.

for operation of the new installation.

In fact, reported indications are that one attendant could maintain two thermoplastic labels in efficient operation, thus considerably reducing operator labor.

How Costs Are Cut

Maintainance demands are almost the same for the new machine as for one of the former labelers. However, since the new machine replaces four of the former, maintainance costs are now cut to approximately one-fourth.

With horsepower requirements less for the new unit than for one of the former, power and labor and maintainance needs are much reduced.

Capital investment is likewise proportionally less, according to this plant, which calculates that cost of its thermoplastic labeler, figured on the basis of capital overhead per case per hour, is less than for the former assembly.

Changeover Rapid

Another reported advantage of the machine is the speed with which the changeover can be made when shifting from one size or shape of container to another, or one size or shape of label to another. For few machine parts need be replaced.

This advantage is inherent in the machine's design, simplicity being accented because no reciprocal motion is employed in any of the essential mechanical elements.

Another factor of prime importance in the consideration of any production line equipment concerns the economics of the unit in plant layout. Considered from this viewpoint, the high-speed dry labeler provides top-flight economy. Its operation is straight-in-line, with an in-line discharge.

In this midwest plant, floor space occupied by the new labeler is but one-tenth that of the old assembly—not only because one unit has replaced four but also because the extensive conveyor system which was necessary in the company's former setup is no longer required.

The dry labeling provides yet another saving. No glue or water soluble adhesive is used. Therefore costs of adhesive and make-up labor are eliminated. Also bypassed is the labor formerly necessary for cleaning adhesive from the machine parts during or after a run. Furthermore, containers and labels are never glue-smeared.

Results In Small Plant

The foregoing plant report may seem to imply that dry labeling is advantageous only to the volume producer. However, the successful adoption of the dry labeler in a relatively small Eastern U.S. operation may be cited here as a refutation of this assumption.

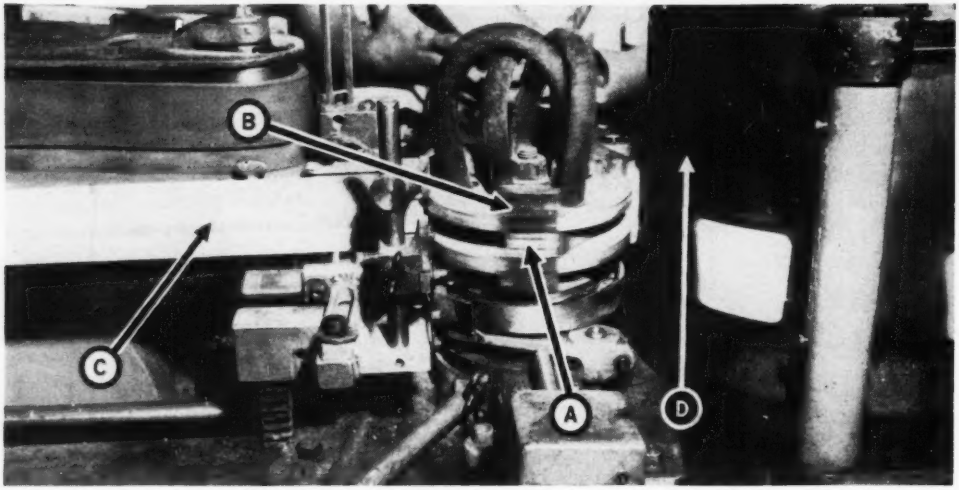
Products of this modest-sized plant are packaged in rigid containers of many sizes and shapes, labeled with both company-owned and private labels. Formerly, during labeling operations—which were part mechanical and part hand—changeover of both container and labels was fre-

. . . on round, tapered, or flat surfaces

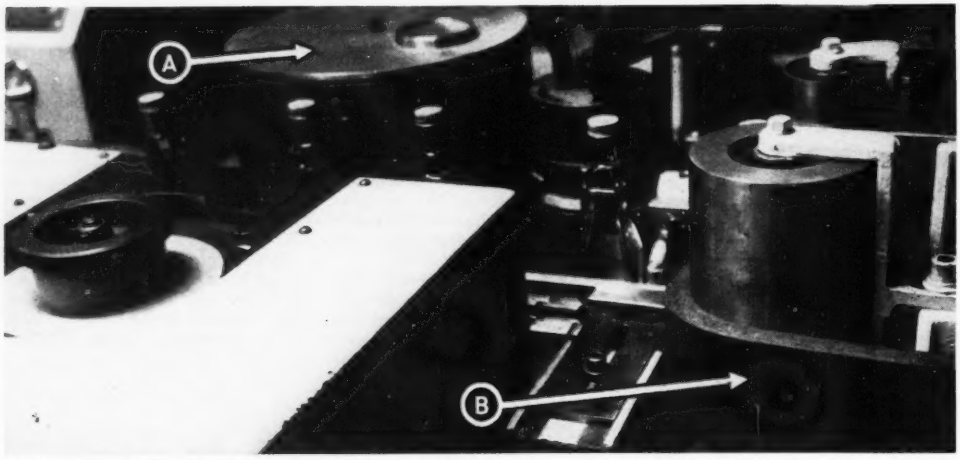
LABELS go on tapered containers (right) as well as on round ones (left).

FOUR-SIDE bottles with flat, curved surfaces are easily labeled by unit.

Closeups Show How Machine Operates



VACUUM PORTS (A) on rotating element (B) suck labels from magazine (C) and transfer them, adhesive side out, onto rotating heating drum (D). Here, label is sufficiently activated for application to container.



ON ROTATING DRUM (A), vacuum ports hold label against heating surface. Activated label is blown against container, where it adheres by one edge until pressed in place by soft rubber conveyor belts (B).

quent. And so, a sizable crew was required full time, just for labeling.

Then one of the new high-speed labelers was installed. And today, labeling of a month's production requires but a few days.

Reasonably Paid Off

Rapid changeover, fast production, and low labeling-line maintainance have reduced labeling costs sufficiently for reasonable amortization of the new equipment. In addition, the heat-applied labels are more accurately located on the containers, have a cleaner appearance, and adhere more tenaciously than formerly.

Not only can the new machine be quickly made ready for a change in label or container, but also, it can be shifted in a short time from labeling bottles to labeling tapered tumblers, and even from round bottles to those with flat sides.

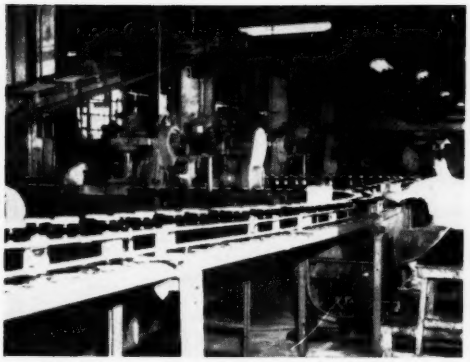
In the latter case, it is necessary to add a specially designed feed attachment (see at left in first photo) which advances the container in line without rotation. Flat faced units are moved forward by means of projecting flights on a conveyor traveling horizontally around vertical pulleys. Flights index the flat surface of the container into the exact position for accurate transfer of the label from the drum.

Construction, Operation

Labels are sucked, one at a time, from their hopper or magazine by vacuum ports in a clock-wise rotating drum, from which they are transfered to a counter-clockwise rotating heating drum.

The exchange is made when the transfer drum has turned 180 deg., at which point the vacuum drawn

OLD: Required four units



IN FORMER setup in Midwest plant, four machines took ten times space of new layout, needed double the labor.

NEW: One streamlined unit

WITH thermoplastic labeler installed, plant's old four-unit output is topped, labor and power costs are less.

through the ports is replaced by air under pressure. Thus the label is blown against the heating-drum vacuum ports, which then hold it in place during heat activation—printed surface of the label against the heating drum. In order to "square" the label, its leading edge is indexed during transfer against a register bar.

Instruments control the temperature of the heating unit, thus assuring that the adhesive on the label becomes only adequately tacky while traveling three-quarters of the drum's revolution. Container speed is synchronized with the speed of the heating unit.

At the point of contact between the jar and heated label, where the transfer is made, the label adheres to the jar on one edge only. The pressure station where contact is completed between container and label, is separate and independent from the label application station. This arrangement avoids dependence on reciprocating motions, thus permitting continuous operations at high speeds.

With one edge of the label adhering to the container, the latter moves ahead by conveyor from the transfer station to the pressure station. Here, the jar is rotated clockwise between a sponge-rubber surfaced conveyor belt and a rubber pad. In some models, the label is pressed home between two soft rubber conveyors that travel either in opposite directions or in the same direction at different speeds. In either case, the label is neatly smoothed onto the container surface, where it adheres permanently.

Cost Pros and Cons

According to some processors who have switched to thermoplastic labeling, the cost of dry labeling cannot be reckoned on the former prices paid for the labels.

True enough, the cost of delayed action, high-speed-applied labels of large area is much more than that of plain labels of the same size. However, since the difference in cost between large and small heat-applied labels is approximately proportional to the area, while the cost difference for the same sizes of plain labels is almost negligible, the greatest variation between plain and plastic label cost is the cost of the large-size labels.

Conversely, the smaller the label the less the difference in cost between the two types. The small label differential is negligible.

When the estimate of labeling cost is based on all factors—production per dollar of capital investment, overhead, cost of operating and maintenance labor, speed of production and changeover—then users report that the balance tips in favor of thermoplastic labels.

In addition, they consider as plus-values the assurance of cleaner labels and the fact that these labels are "welded" in place.

This latter characteristic of the heat-activated dry labels—the weld-like type of bond with the container—is welcomed by most users as a guarantee that the labels will not fray at the edges, loosen, shift, or pull off the container to which it is applied.

It may be noted, however, that this firmness of adhesion did pose a minor problem when attempts were first made to clean these tight-bonded labels off return bottles.

The usual bottle-washing procedure proved inadequate. However, there are now at least two compounds on the market that are reported to completely remove labels and adhesive and deliver thoroughly clean bottles. These compounds are used in the standard types of bottle-washing machines.

It may be pointed out that when the machine is changed over from smooth-surface containers to pebbled-glass types, a measurable increase in pressure is required.

Label Storage

Heat-activated labels require greater care during storage than plain labels. If kept for lengthy periods in areas near radiators or steam pipes, where the temperature may at times rise higher than the "free-point" of the adhesive, then the plies in the rolls or stocks of sheets may cling together so that they cannot be separated.

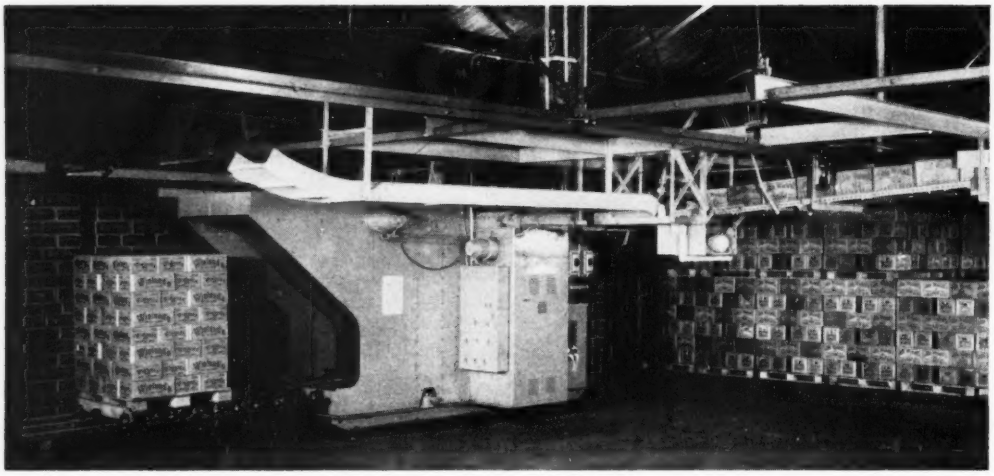
Storage, therefore, should be in a cool room. Also, rolls should not be laid on their sides, and stock should never be piled over 10 to 12 reams high. Another point of importance is length of time in stock, which should be kept to a minimum, consistent with minimum inventory requirements.

Converted Units

Other labeling machines have frequently been adapted to apply thermoplastic labels, both of the instant and delay-set types. In particular, these adaptations have been made to apply labels at standard speeds to flexible packages, including cakes, cookies, and crackers, packaged cheese, and meat products, either packed in cartons or wrapped in film.

Also, numerous conversions have been made to handle label-seal bags containing such products as fruits, nuts candies, and cereals. Moreover, these labels can be applied, if desired, by hand-operated machines.

Cases of Bottled Goods



LOADER arranges six different beer-case sizes, each to predetermined pattern, so all of the cases are formed into stable

Robot Stacking by Pallet Loader

Tailored to units it handles, machine zips cases into patterned blocks at great saving in labor . . . Spotlighting its versatility are varied loading tasks performed in a chocolate plant, a brewery, and a cereal factory.

MARKED ADVANCES in the handling of cased finished products are being achieved by food processors through the almost-automaton operations of pallet-loading equipment.

Noted particularly is the versatility of the pallet loader in "mechanically shouldering" jobs in widely different types of food plants handling widely different types of products.

A recent check in varied companies employing the equipment—a chocolate plant, a brewery, and a cereal factory—brought graphic illustration of its effective performance with cases of canned goods, with bottled products, and with dry foods, respectively, with the benefits—

1. High-speed, accurate palletizing of cases at the rate of 1,800 per hour.

2. Loading of either the same or different-size cases delivered by separate conveyors fed from different filling and closing line.

3. Reductions in labor and, accordingly, dollar savings.

The story of the installation at the Hershey Chocolate Corp., in Pennsylvania, gives the salient points. Says Plant Engineer George T. Bohner:

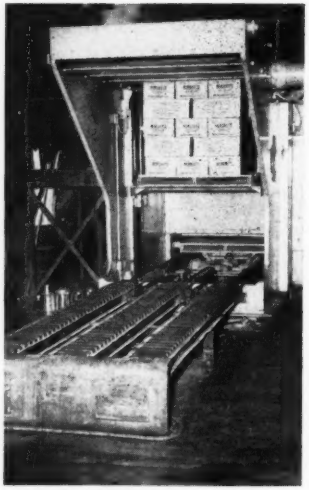
"Materials handling at our plant had long been based on a high-speed system of continuous conveyorized handling-during-production. Then, a real advance was made when our engineering department discovered the economies obtained in case handling and storage operations when a fork-truck-transport pallet system takes over where the high-speed conveyor system leaves off.

"The gap between the two mechanized systems was then bridged when we installed the pallet loader (made by Lamson Corp., Syracuse, N. Y.) that now automatically and precisely stacks on pallets the cases coming from one or more of our conveyor lines."

Loaders Designed for Job

"Each pallet loader is built to accommodate one size of pallet, as specified by the user. Lengths may vary between 32 and 48 in., widths from 40 to 50 in. We found that, for our purposes, a pallet measuring 46¼x45x4½ in. is most useful.

"Our loader, designed accordingly, is installed in the syrup-division ship-



WHEN LOADED, pallets are dropped to discharge conveyor.

stacks. (Pacific Brewing & Malting Co.)

ping room. After the syrup is canned and packaged on the second floor, cases travel along roller conveyors and then down chutes to the first floor palletizing area."

Further brought out by Mr. Bohner was the following:

Multiple Lines Feed Machine

Three conveyors feed cartons from the second floor to the palletizing room. Two of these lines carry 16 oz. cans of syrup in cartons measuring $9\frac{5}{16}$x$12\frac{1}{8}$x$8\frac{5}{8}$ in. The lines merge into a single accumulator conveyor which combines live and gravity rollers and belt sections, and which, as well, houses the electronic switching and selecting devices that trigger the pallet loader's feed.

The third line accumulates packages of No. 10 cans of syrup, which are produced only about one-third as fast as the 16 oz. cans. The No. 10 cans are packaged in cartons measuring $12\frac{1}{4}$x$18\frac{3}{8}$x$7\frac{7}{8}$, a size different from that in which 16 oz. cans are packed.

Since the pallet dimensions are standard for both sizes of cartons, the machine must not only load cartons onto the pallets but also must change the loading pattern for each different size.

When the two-line conveyor system is feeding cartons of 16 oz. cans to the machine, it palletizes them according to one predetermined pattern. However, when the single line feeds the machine, an entirely different pattern is automatically set by the machine's mechanism.

Operate Simply

To the casual observer, the pallet loader may seem to be a study in organized confusion. Actually, nothing could be further from the truth. These highly mechanized machines operate quite simply. Empty pallets, ten at a time, are loaded into a magazine at the rear of the machine. When the pallet release-mechanism is actuated, one pallet is automatically fed into the machine and onto an elevator.

During the time the machine arranges the first layer of cartons, the elevator raises the pallet to a position within $\frac{3}{4}$ in. of the under surface of the stripper plate—the plate on which cartons are assembled to make up each layer.

Cartons Turned Automatically

As cartons are released from the accumulator line, the electrical control system automatically connects the pattern cartridge that regulates the assembling of cartons for each layer, as well as the number of layers per pallet load. This cartridge controls a package rotating bar that rises to turn the predesignated carton through 90 deg. when the patent requires.

Now, as each row of packages reaches its proper position on the live roller bed of the pallet loader, a ram pushes the row onto the stripper plate. When this plate is withdrawn, the completed layer drops a short distance onto the pallet. Then a lowering device takes over and drops elevator, pallet, and cartons sufficiently to receive the next layer.

When stocking is completed, the loaded pallet is lowered to a chain conveyor and then discharged onto a roller section that provides temporary storage.

In the Hershey plant, when lines are operating at full capacity, 16 oz. cans of syrup are produced and packed

Boxes of Canned Products

CASES of canned syrup approach (lower left) lined up in loading pattern. Then they move on rollers into position to be pushed ahead by ram onto sheet metal plate above pallet. (Hershey Chocolate Corp.)

almost four times as fast as the No. 10 cans. Accordingly, a "favored line selector system" is employed on the accumulator lines. In other words, the line of cased 16 oz. cans runs continuously except when a full pallet load of No. 10 cans has accumulated on the storage conveyor on that line.

Overflow Arrangement

Provision has been made for robot handling of any emergency overflow on either line. When cartons of 16 oz. cans back up to a switching point, a gate in the roller section raises automatically to permit cartons to slide down a chute to a hand loading table.

When the No. 10 can line backs up, a manually actuated gate can be raised to feed cartons to another manual loading table.

Few Production Problems

As in most such arrangements of various units in sequence, the operations are not expected to be entirely trouble-free. But difficulties run to the minimum.

Actually, the principal source of down-time is a tribute to the speed and efficiency of operation of the loader. In short, output via the lines from the packaging machines occasionally falls behind output of the palletizing machine, which then is forced to suspend operations for lack of cartons.

It was also found that to obtain peak efficiency from the loader, the carton sealing machines must function at top performance. When two cartons reach the loader, glued together at the ends in such a way as to interfere with the formation of the pattern, the loader shuts down. Then the fork-truck operator must free or remove the stuck cartons.

Sometimes, too, a damaged pallet slips by inspectors and is fed into the pallet magazine. When this happens, the machine again shuts down, automatically, until the operator has cleared it.

However, down-time in these instances is brief, and operating time lost is negligible. And even though none of the sources of down-time is inherent in the design of the loader, the unit is amply protected by safety switch devices against any and all damage to machine or cartons.

So far, maintenance on the unit at Hershey has been slight, with no problems encountered which the engineering force couldn't solve.

"Best of all," concludes Engineer Bohner, "we have finally closed the gap between our repetitive, high-speed conveyorized production operation and the unit-load storage system.

In Brewery: Vari-Size Job

At Pacific Brewing & Malting Co., San Jose, Calif., a palletizer serves as an automatic means of changing the continuous flow of cases of Wieland's Beer from belt, or other type conveyor, to a storage area, with all cases accurately stacked on pallets.

Cases, in any two of six different sizes, arrive at the top of the loader in lines, and are delivered pallet-stacked according to pattern, from the bottom of the machine (only like cases on any one pallet).

Though the number of cases per pallet may vary between 60 and 96, the machine stacks each size case in the predetermined "best" arrangement for that size and shape, alternating between two feed lines according to the volume of cases along each.

A series of electric eyes regulates the flow of the cases into the palletizer. Then, electric relays control the turning of the cases in the palletizer to fit the stacking pattern.

To switch a pattern, after the end of a run of a particular size package, to a pattern for another size case takes only the the time necessary to pull out one electric plug and put in another. Thus, all half-dozen different Wieland packages can be loaded by the palletizer.

The unit itself occupies less than 200 sq. ft. of space in this Brewery's warehouse. Allowing for the additional space necessary for maneuvering about the machine, the total requirement—installation and working space combined—is about 500 sq. ft.

With Cereals: Stacking Stability

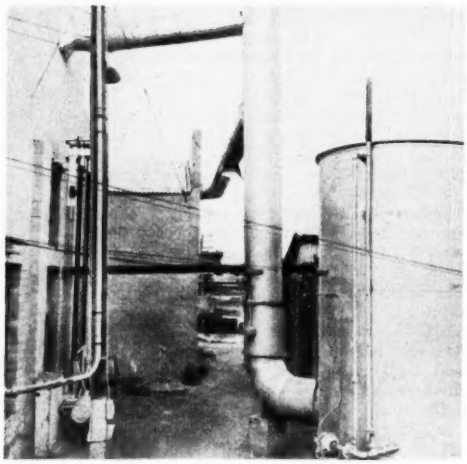
At Ralston Purina Co., Battle Creek, Mich., where all cases of cereals palletized mechanically are the same size, the arrangement of each layer on the pallet varies. The pattern, predetermined for maximum stability of the stock is executed meticulously by the electrical attachments that control the machine's operations.

Although the pallet size employed and the number of cases per pallet is less than at Pacific Brewing & Malting Co., the unit at Ralston's loads 50-55 pallets per hour with as many as 1,800 cases.

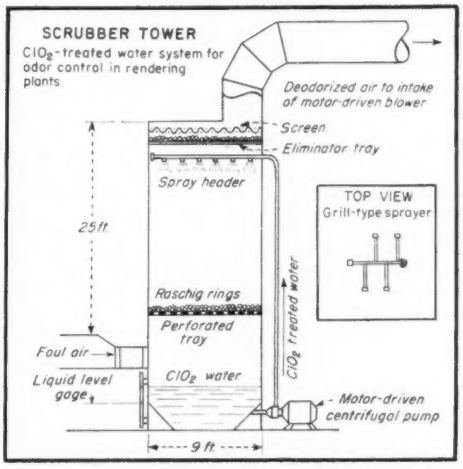
Containers of Dry Foods

EMPTY PALLETS are loaded into magazine (right) from which they are fed as needed. At center is seen pattern-control unit. (Ralston Purina Co.)

DIFFERENT cartons are separately palletized by pattern without error.



Deodorizing System Installed



How Absorbing Process Works

Air-Contaminating Odors Banished by New Treatment

Offensive gases evolved during processing are evacuated to base of outside scrubber tower, and chlorine dioxide deodorizer solution is re-circulated to absorption system . . . Success in many plants cited

E. R. WOODWARD and E. G. FENRICH
Technical Service Department and Manager of Chlorite Division, respectively, Mathieson Chemical Corp., Baltimore, Md.

Within the past few years, the atmosphere contaminators have been assailed by a great public hue and cry. And the importance of this subject was given special emphasis at the U. S. Technical Conference on Air Pollution, held in Washington, D. C. in 1950.

This article reports certain observations and experiences arising from practical work by the authors in finding a way to eliminate obnoxious odors emanating from animal-fat and fish-rendering plants.

It now appears that a satisfactory remedial process has been developed, using a combination of chlorine and chlorine dioxide for deodorizing offensive gaseous discharges from such plants.

By reaction of an excess of chlorine water with sodium chlorite solution, chlorine and chlorine dioxide are formed. The odors are then drawn through a suction tee into a water line discharging to a tank where make-up water containing chlorine and chlorine dioxide is added. Water from this tank is then recirculated to the absorption system.

Chlorine dioxide has a selective oxidizing action which destroys many objectionable industrial organic odors. It should, therefore, play an important part in solving several of the atmosphere-pollution problems.

There are two main sources of objectionable odors in rendering plants. each requiring a separate method of handling. General practice in each instance is briefly described:

1. **Condensable vapors from cookers and dryers.**—A separate duct from each cooker joins a common header which carries the odorous vapors to a series of barometric condensers, usually one for each cooker. The water stream passing through the suction tees, or aspirators, absorbs the vapors and odors. If water is plentiful, this is usually a once-through operation, and chemical treatment of the effluent is omitted unless stream pollution becomes a problem. Where water is restricted and the condenser water is recirculated, there should be treatment with chlorine dioxide at the concentration required to kill the odors.

2. **Atmosphere in buildings where odorous vapors originate from operations such as unloading and crushing of raw stock, dumping rendering cookers, blood drying, and killing.**—Here, the atmosphere should be evacuated at frequent intervals—once every 2 or 3 min. while operations are proceeding. This polluted air should be

drawn through a scrubber tower, where it can be washed and deodorized by chlorine-dioxide water.

Chlorine-Dioxide Method

First indication that chlorine dioxide might be effective in solving this problem was afforded by an initial experiment made a few years ago in a New England rendering plant. Used here was a system whereby the atmosphere of the buildings, which house the company's raw stock receiving platform, crusher and cookers, was evacuated by a large fan and drawn upward through a vertical duct to the roof. The effluent then passed out to the atmosphere through a water curtain, formed by a series of spray nozzles.

The experiment consisted of bleeding into the vertical duct (near its base) a stream of chlorine-dioxide gas diluted with air. The generator producing the chlorine dioxide-air mixture could be turned on or off at will. By putting their heads into the duct (near the top), observers could definitely determine, by the presence or absence of obnoxious organic odors, when the chlorine-dioxide flow was off or on.

Further experimental work carried out in a Texas rendering plant utilized a 4-in. and 15-ft. high tile pipe, fitted with a perforated tray supporting a layer of coke at each bell joint. A portion of the polluted air from the plant was blown upward through this tower, while a water solution of chlorine dioxide was circulated continuously to the top and picked up again, from a sump at the base of the tower, by a small pump.

Unfortunately, no quantitative data were kept on this operation, but it was noted that under the conditions used, no organic odors emanated from the top of the tower for a 16-hr. period while the chlorine-dioxide solution was in use. At the end of that time, the chlorine dioxide was spent, and the obnoxious odors again became noticeable. By re-charging the system with fresh chlorine-dioxide water as before, another 16 hr. of odor-free operation was achieved.

A Fingertip Brief on the Question

The problem of this type of air pollution is extensively discussed by D. Ronald,* who goes to the heart of the matter by considering the nature of the gases given off in animal-fat and fish-rendering plants. Reported is the presence of ammonia and its derivatives, the methyl and ethyl amines, also hydrogen sulfide. These water-soluble gases are carried off in the condenser effluent.

He also offers pertinent data comparing relative volumes of gases given off from fresh and stale raw stock. In rendering fish from these types of stock, ammonia and monomethylamine increased from 39 parts per 100,000 for fresh stock to 123 for stale stock. Dimethylamine rose from 2.4 to 5.77, and trimethylamine from 31 to 128.

In the case of animal flesh, the increases were more marked—ammonia and monoethylamine jumped from 52 to 578 parts per 100,000; diethylamine from a trace to 19.67; and triethylamine from a trace to 34.83.

Mr. Ronald goes on to state that laboratory experiments with calcium hypochlorite showed that if a contact period of 30 sec. were given with a normally strong solution, deodorization would be complete. Ultimately, he decided that 0.35 percent of available chlorine should be the minimum concentration in condenser water for complete odor elimination.

Industrial experience in the U. S. over the past several years has not confirmed these results. In fact, since 1922 when Henderson and Haggard were granted a U. S. patent for their process of "deodorizing offensive gaseous emanations from organic matter," chlorine gas has been tried extensively for this purpose in industrial plants without much success. Mute evidence of this is found in many rendering plants around the country where chlorinators were installed some years ago, and later stood idle when it was found that chlorine alone has a temporary masking effect, but does not destroy the obnoxious odors.**

It should be noted, however, that where chlorine is used to stop putrefaction of organic matter by sterilizing it, there is a reduction of objectionable odors.

McCord and Witheridge* have referred briefly to the use of chlorine dioxide in public waterworks for taste and odor improvement. Although they have described in considerable detail the atmospheric pollution problems of the rendering industry, they do not report any use of chlorine dioxide for this purpose.** ***—E.R.W. and E.G.F.***

* D. Ronald, *Offensive Trades*, Wm. Hodge & Co., Ltd., London, England, 1935.
** "Chlorine Dioxide for Odor Control," *Chemical Engineering*, May, 1951, p. 135.
*** McCord & Witheridge, *Odors, Physiology & Control*, McGraw-Hill Book Co., 1949.

With these results in mind, and impelled by the fact that the local court was threatening to shut down the plant unless atmospheric pollution was stopped, the management decided to install an odor-control system.

First step was to provide an adequate system to collect polluted atmosphere within the plant and then feed it into treating equipment.

As a starter, the solvent-extraction cookers and blood dryers were rehoused in a new tight building of hollow block construction. Two large openings in the wall of the building, near the roof and behind the cookers, were connected with two 34-in. dia. ducts leading to the base of a scrubber tower outside the plant. This tower is 10 ft. in dia. and 15 ft. high. It is fitted with two perforated trays, each supporting a layer of coke.

An induced-draft fan handling 16,000 cu. ft. of air per minute pulls the polluted atmosphere out of the building, evacuating it once every 2 min. A small centrifugal pump, at base of scrubber tower, picks up the chlorine-dioxide water from the sump and lifts it to the top of the tower. The treated water feeds a header that is fitted with a series of spray nozzles projecting a curtain of chlorine-dioxide water above the lower tray containing a layer of coke or Raschig rings. The upper tray with its layer of packing acts as an eliminator to prevent undue loss of chlorine dioxide-treated water, some of which would otherwise be drawn out to the atmosphere by air suction.

Needs Vary

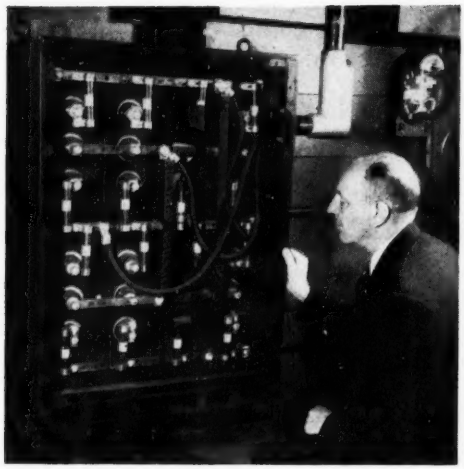
At 70 deg. F., the solubility of chlorine dioxide in water is 2.9g. per liter, or 2,900 ppm. For odor-control purposes, 100 to 500 ppm. of available chlorine as chlorine-dioxide in water should be ample to destroy the objectionable organic odors. Requirements will vary at each plant.

When optimum operating conditions have been determined, water in the system should be analyzed periodically for chlorine-dioxide content. For this purpose, a suitable set of color standards, indicator solutions, and a comparator can be used. When the chlorine-dioxide concentration falls below the required level, additional amounts can be added to the system from the generator.

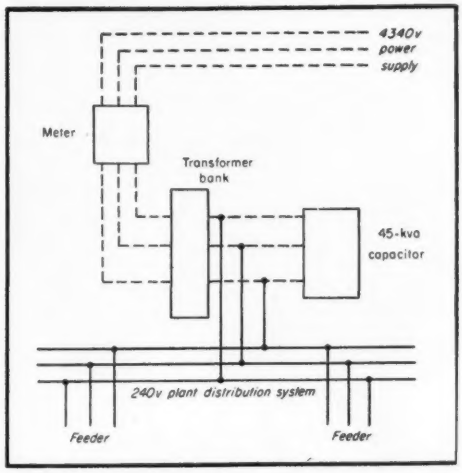
In this plant, the odor-control system will be extended to include the building housing the melters and the grease house.

When these two buildings are connected, fans evacuating them will convey another 16,000 cfm. of air to

(Turn to page 207)



$33 SAVING in monthly electric power bill of Cleveland Sandusky Brewing Co. results from improvement made in the plant's power factor by this special 45-kva. capacitor installation.



CAPACITORS are connected to incoming power lines following transformer bank that reduces voltage from 4,340v. to 240v. for plant distribution system. Capacitors are permanently on line.

Capacitor Installation Cuts Power Bill

Greatly improves power factor to save $33 monthly in brewery. No synchronous motors employed

R. C. BUNTING
Editorial Assistant, McGraw-Hill Cleveland Office

How electric power costs can be cut in many types of food plants has been demonstrated by Cleveland-Sandusky Brewing Co.

With no synchronous motors in the brewery, the power factor had dropped below 85 percent as the use of electrical equipment increased. And since it costs a power company more to supply electricity at a low power factor than at a high one, the monthly power bill is adjusted accordingly. In this case, the measured power demand is multiplied by a factor of 85 and divided by the average percent power factor.

With an electric power load ranging from 125 kw. in winter to 218 kw. for peak summer operations, the brewery has effected an average monthly power bill reduction of $33. And this was achieved simply by installing capacitors totalling 45 kva. to boost the power factor to 99 percent in winter and 96 percent in summer, for a 97 percent average.

It cost the brewery $1,095 to make the installation last August, so the capacitors will pay for themselves in less than three years, even at the present power load.

The capacitors are connected to the power supply lines where they leave the transformer bank that reduces the 4,340v. incoming power to 240v. for distribution through the plant. And the capacitors remain on the line all of the time.

To permit future addition of capacitance in event of increased power load, installation of the 45 kva. of capacitors was in a 60-kva. cabinet. Mounted on a 9-in. iron stand against one wall of the engine room, this cabinet measures 42½x29½x19½ in. Weight of the entire unit is 1,000 lb.

Installation of synchronous motors to drive refrigeration or other equipment is another means of correcting power factor. And the long-range plans of Cleveland-Sandusky call for such a move. The motors will replace two steam engines which now drive equipment and exhaust steam to processing and heating units. Meanwhile, however, the capacitor installation is helping the brewery to keep costs down—a must in its highly competitive industry.

Power Factor Explained

With alternating current, electric power consists of voltage and current, each of which follows a sine-wave pattern as the direction reverses during the cycle. When the current wave lags behind the voltage wave in phase, the power factor is less than 100 percent, and actual power is less than apparent power (amperes multiplied by voltage). Power factor is defined as the ratio of actual power to apparent power.

Induction motors cause the current wave to lag behind the voltage wave. But capacitors and synchronous motors have the opposite action, and therefore raise the power factor.

In effect, high-power factor reduces the amount of power required, curtails line losses, and permits a distribution system to carry more power.

ATTENDANT controls stream of preheated corn syrup being blended into batch of fruit from fixed piping.

Eye on technics pays off in . . .

Quality Preserves Using *Corn Syrup*

Processors who've kept abreast find proper mixes employing corn product improve their jams and jellies, also pare costs

FLOYD A. LEWIS
Corn Industries Research Foundation,
New York City

Today, many former doubts about the advantages of using corn syrups in jams, jellies, and other preserves, are being erased.

A better speaking acquaintance with the syrups, engineering advances in handling, and recently developed process "know-how" have all combined to bring about an enlightened situation.

As a consequence, many new benefits in employment of corn sweeteners have been uncovered.

New Federal regulations have also been a factor in stimulating further use of corn syrups and sugar solids. They authorize the use of these corn agents in quantities up to one-fourth of the total preserve sweetener content without label declaration.

In the preserving industry, emphasis is distinctly on quality. In achieving its large growth of recent years, the industry has had to compete with the biggest jelly-making group in the world—the housewives. Only high quality could induce broad substitution of manufactured jellies, jams and preserves for the traditional home-made product.

Even though many manufacturers of quality preserves have successfully used corn syrups for many years, a few preservers still primarily regard them as a substitute—to be used only if necessary.

Some prejudice was found to stem from unsatisfactory experiments made years ago. And since then, many manufacturers appear to have missed the fact that today's syrups are improved. An old epigram sums up the situation: "What you're not 'up' on, you're 'down' on."

Also, today's advanced manufacturing methods are better suited to the use of corn syrup.

Those makers who are "up" on the developments claim that the advantages to be gained more than justify the trouble and expense of handling another material in the plant.

¶ "What you're not 'up' on, you're 'down' on," says an old adage . . . And, suspects Author Lewis, that's likely the reason so many preservers are still shying away from corn syrup. To "put the issue right," he points to numerous benefits credited to the newest methods with the product.

Here are four credit-items in favor of using combinations of sucrose and corn syrup in place of all-sucrose type sweeteners, as reported* by actual users:

1. Elimination of sugar-crystallization, which quite frequently occurs in opened jars of jellies and jams when stored in the refrigerator.

2. Reduction of an "overpowering sweetness," thus making for more prominence of the natural fruit flavors.

3. Improved color and texture in the preserves.

4. Somewhat lower cost of raw materials in most cases.

Many manufacturers say that they would continue to use corn syrup even if the cost were higher than represented by the portion of sucrose replaced.

Just What Is Corn Syrup?

Corn syrup is a product obtained from corn starch by partial hydrolysis, clarification, decolorization, and evaporation to syrup density. Degree of hydrolysis, or conversion, of the starch is controlled to produce so-called medium (or regular) and high-conversion syrups. All types contain about 20 percent water. The medium-conversion syrup may be dehydrated to form corn-syrup solids.

All corn syrups are mixtures of dex-

* "Competitive Relationships Between Sugar and Corn Sweeteners," *Agricultural Information Bulletin No. 48*. Government Printing Office, Washington ($1.00).

trose, maltose, higher sugars, and dextrins. The proportions vary with the degree of conversion. As conversion proceeds, the dextrose and maltose portions increase and the higher sugars and dextrins decrease. High-conversion syrups are thus sweeter than the medium varieties. They also have greater fluidity and better color stability.

About three-quarters of the corn syrup used in jellies and preserves is of the medium-conversion type. Because of their slightly higher cost, high-conversion syrups are usually employed only where their greater sweetness and fluidity are desirable.

The solids cost slightly more than the syrup from which they are produced, because of the additional cost represented by the dehydration. Since they are hygroscopic, however, they have been used to only a very limited extent by the preserving industry.

Syrups Moved by Pumps

One of the basic requirements for successful use of the syrup is convenient and efficient handling into the manufacturing processes. At the same time it must be kept free from contaminants.

Proper handling is best illustrated by describing the system used by a typical manufacturer: Syrup is delivered to the plant in tank cars and is preheated to about 100 deg. F. before being unloaded, in order to increase its fluidity for pumping. Then the syrup is pumped through permanent piping to storage tanks on the top floor of the building. Two tanks have been installed in this typical plant to provide storage for several tank-car loads.

From storage, syrup is pumped through a permanent piping system extending to all mixing floors. Each cooking kettle has its own outlet. Flow meters installed near the kettles can be set to introduce predetermined quantities of syrup. And pump control stations are located at convenient points on the mixing floors.

When an operator is ready to add syrup to a mix, all he needs to do is set the meter and start the pump. After the predetermined amount of syrup has been fed in, the meter automatically stops the pump motor.

To maintain the syrup at uniform consistency, thermostatically controlled electric heating elements are wound around the piping in the delivery system, all of which is wrapped with insulation. These elements automatically maintain the syrup temperature at 100 deg. F.

Simpler arrangements may be used where operations do not warrant permanent piping. Plants purchasing syrup in drums, for example, may employ any of the common devices for supporting the drums. An ordinary chain hoist will do the job. Then a short length of pipe with appropriate cut-off may be screwed into the outlet to draw out syrup as needed (dipping the syrup from the drums is not recommended).

To insure accurate measurement in the batch, the drum is weighed on any small platform scale and the required amount drawn off and checked by weight difference. Where drums are preheated to increase syrup fluidity, care must be taken to keep the temperature at or below 100 deg. F.

After a system for proper handling

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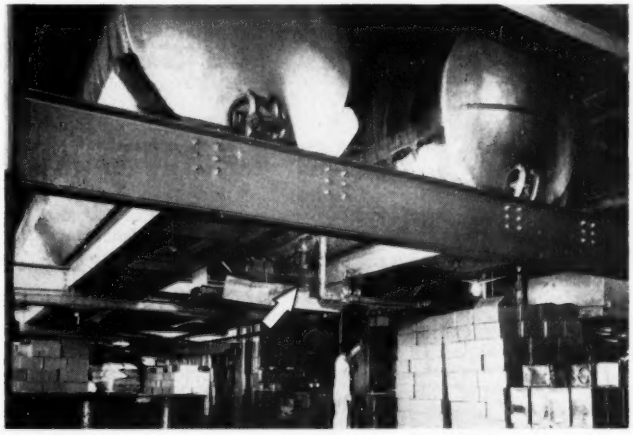
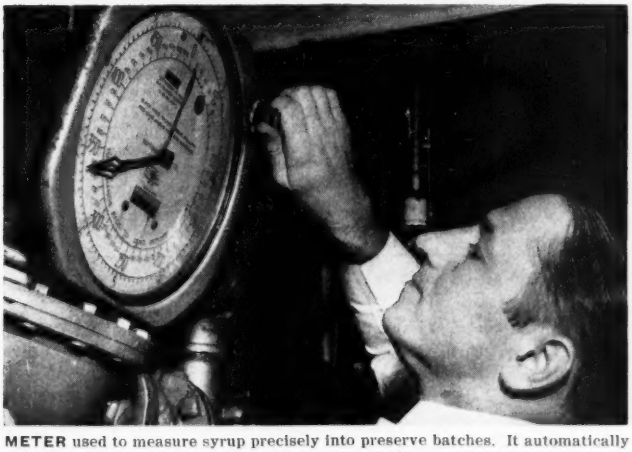
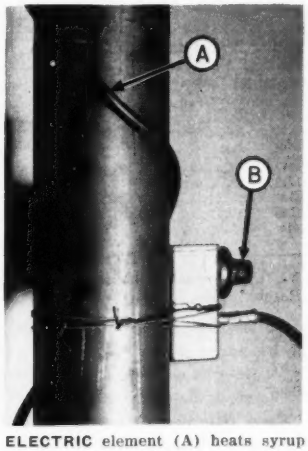


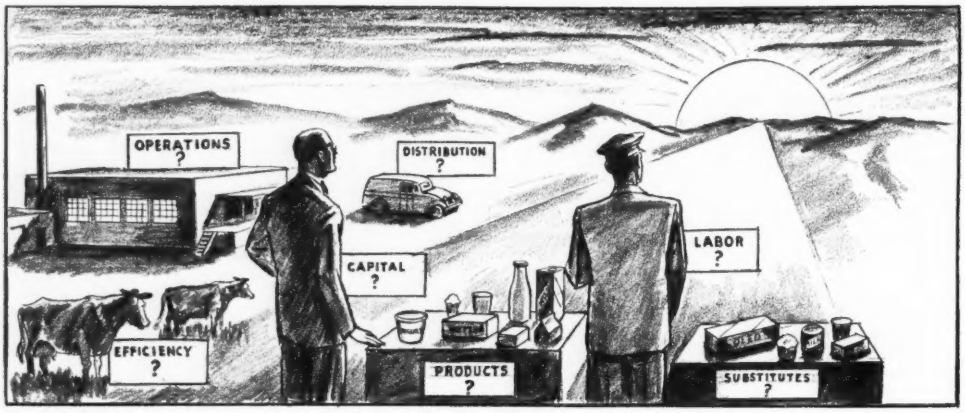
CORN SYRUP storage tanks ceiling-installed in large preserving plant. Pump (arrow) sends syrup through permanent piping to kettles.



METER used to measure syrup precisely into preserve batches. It automatically switches off pump motor when right quantity is in.



ELECTRIC element (A) heats syrup in piping. 'Stat (B) keeps it at 100 F.



What's Ahead

For the Dairy Industry?

Here is an outstanding authority's practical, "foot-on-the-ground" perspective of tomorrow's operations—as ranged by his objective gaging of factors that shaped today's business out of yesterday's

P. H. TRACY

Department of Food Technology,
University of Illinois, Urbana, Ill.

Here, on our examination table, we have the U. S. dairy industry. As for its *past*, we know well enough what that's been, having experienced it.

TABLE I—PRODUCTION Per Cow Has Increased Gradually in Recent Years

Year	Total Production (Billion Lb.)	Per Cow (Lb.)
1940	104.0	4,890
1948	115.5	5,036
1949	119.1	5,243
1950	120.6	5,239
1951	120.0 (est.)	.....

But just exactly what is its *present*?

And—most pertinent—what will be its *future*?

As for the first question, we can get the perspective by running our fingers down the records. But the second question is something else. Crystal gazing has its drawbacks. A man tends to enter the cold sphere of prediction rather gingerly.

Nevertheless, a careful examination of the field shows that the trends are there. And in this article I will try to spot them.

Definite changes are taking place in the milk production phase of the dairy industry. While our human population is increasing at the rate of about 2 million per year, the total number of dairy cows is decreasing slightly.

This would be serious if it were not for two things: (1) A gradual increase (Table I) in the average production of dairy cows, and (2) a decrease in demand for milk solids, resulting from the use of substitute products. Nevertheless, it is a condition that is not healthy for our industry.

A number of dairy farmers, particularly in the North Central States, have been attracted into the growing of grains (high prices and a less confining routine), and hence have sold their cows (Table II). Others are switching

TABLE II—NUMBER of Cows Has Decreased Slightly in Recent Years

Cow Population, 1940–1950, Thousands

Year	Ill.	Minn.	West N. Central	East N. Central	North Atlantic	South Atlantic	U. S.
1940.....	1,061	1,633	6,163	5,855	3,085	1,763	23,643
1944.....	1,123	1,743	6,607	6,464	3,212	1,962	25,818
1949.....	944	1,396	5,169	5,938	3,163	1,931	22,705
1950.....	925	1,370	5,139	5,911	3,172	1,978	22,757

TABLE III—MILK PRODUCTION Has Not Kept Pace With Growth of Our Population

Total Output, 1940–1950, Millions of Pounds

Year	Ill.	Minn.	West N. Central	East N. Central	North Atlantic	South Atlantic	U. S.
1940.....	5,188	8,405	27,712	30,644	17,361	6,572	109,510
1942.....	5,617	8,995	30,245	33,839	18,270	7,056	119,240
1944.....	5,503	8,390	28,981	34,008	17,837	7,366	118,555
1949.....	5,249	8,404	26,538	35,586	19,843	8,471	118,245
1950.....	5,180	8,253	26,711	35,682	20,216	8,699	120,555
% 1950 is of 1940.....	99.9	98.2	96.4	116.4	116.4	132.4	110.1

to different forms of livestock farming. To some extent this has been offset by an increased interest in dairy farming in the south (Table III).

Some economists say that this situation "will be changed by our next depression." I personally doubt this. I believe a more permanent cure will be to make dairy farming more attractive to young people. This can be done through the use of better animals, better breeding, larger herds, more labor-saving devices, and a shorter work week.

Wanted: A Stimulant

Per capita consumption of milk and milk products has not shown as great an increase during the past 40 yr. as one might expect (Table IV). But there are some exceptions. Evaporated and powdered milks have made consistent gains. And cheese has shown a nice growth. Ice cream consumption has increased regularly, except during the depression of the '30's, World War II, and in the period following the peak of 1946. Sale of fluid milk and cream has not been in proportion to the possibilities, and consumption of butter has, of course, moved downward.

What can be done to stimulate the use of milk and milk products?

The cheese people seem to have an answer—concentration in a few large companies, resulting in increased efficiency, better quality, more acceptable packages, increasing types of products, and better merchandising.

People will use more dairy products if we make them tastier and easier to get, place them in more attractive packages, sell them cheaper and, finally, use more effective advertising and merchandising methods.

We need to do a better job of battling for our share of a corner of the human stomach. To do this we must make greater use of sales methods in order to increase consumer demand.

This will have to be done, of course, at the expense of other foods. Therefore, unless the quality of our products is high and the price right, increased per capita consumption will not be permanent. We may also have to adjust upward the percentage of our sales dollar spent for advertising and merchandising.

One very important fact should be remembered in our effort to increase sales—nothing is gained for the industry as a whole through increasing volume by taking accounts from your competitor. Tricky price cutting, secret rebates, and connived purchasing of accounts are unethical business methods that should be replaced with sensible and business-like procedures.

Capital will remain invested in dairy enterprises only so long as it is secure and will return a reasonable income. When returns from a dairy plant reach the point where the money invested would be more secure or more profitable if used in other ways, then the owner of that capital is likely to liquidate his assets. This is what has been taking place at an alarming rate in recent years.

Twenty-five years ago there were approximately 1,800 milk dealers—large and small—in the city of Chicago. Today, there are less than 100. There are a number of reasons for this decrease. Undoubtedly one important reason has been the increased labor cost.

Labor should be given its just reward, for after all the people who operate our plants are the most important part of those businesses. However, labor and management must realize that, as hours are shortened and wages increased, the productivity of labor must be increased also or the cost of the finished product will rise so high that its consumption will decrease.

Moving to Stores

A good example of what happens under such conditions is the history of the retail milk business. The service involved in delivering milk to the home has become so expensive—because of high labor costs, restrictions on amount of milk and milk products one person can deliver per load, the number of hours each person can work per week, and the opposition to the introduction of savings through reduced numbers of delivery per week—that the sale of milk is moving rapidly to the food store and, more recently, the vending machine.

Possibly, from an efficiency point of view, this is a good thing, although many dealers still believe house-to-house delivery is a better way to sell milk.

Single Standard Needed

There is no food industry so extensively supervised and regulated by federal, state, county, and city health officials as the dairy industry. The need for simplification and unification of these regulations is apparent even to consumers. Local sanitary codes constitute trade barriers. They would not be a problem if we had long ago adopted a unified system of milk grading.

We assure consumers that all dairy products are safe and of high quality. Yet milk used to make condensed milk or cheese, for example, may not be considered suitable for bottling.

Just how are we to explain this discrepancy to consumers without losing their confidence in our advertising regarding the merits of dairy products?

If evaporated milk is satisfactory for feeding babies, why wouldn't that same milk, pasteurized and placed in glass bottles, be suitable for consumers who prefer to use the unsterilized product? It surely cannot be that one is safer than the other for we, as an industry, are on record that any properly pasteurized milk is safe. A single standard of quality obviously would do away with such discrepancies.

If we could get away from the idea of grading milk on the basis of its use and establish a single standard, regardless of whether it is to be bottled or used in making butter, there would be a great improvement in the quality of manufactured dairy products and a more equitable distribution of the cost among various industry users.

Years ago the dairy industry estab-

P. H. Tracy

The Trends As I See Them—

1. ***ARE TOWARD fewer*** **cows**
2. ***Shifts*** **in dairying locales**
3. ***Drops*** **in milk, cream consumption**
4. ***A Smaller*** **number of plants**
5. ***Greater*** **sales through stores**
6. ***A Rise*** **in vending-machine sales**
7. ***Standardization*** **of sanitary rules**
8. ***Wider*** **interest in low-fat foods**
9. ***More*** **substitute products**
10. ***A Switch*** **to higher-quality butter**
11. ***Centralization*** **of operations**
12. ***A Swing*** **to continuous processing**
13. ***Automatic*** **packing of products**
14. ***Washing*** **of pipelines in-place**
15. ***Tank-truck*** **pickup from farms**
16. ***Better*** **labor relations**

lished the practice of paying for milk on the basis of the fat content alone. This was done, of course, at a time when milk was used largely for butter making, and skim milk was discarded or fed to hogs.

Fat Carries the Load

Today we justify daily milk consumption, particularly during the period of rapid growth of children, on the importance of the skim milk portion in supplying protein, minerals, and vitamins essential for proper nutrition. And we are beginning to realize the importance of these nutrients to those in the aged group.

But in spite of this greater emphasis on non-fat solids, we continue to buy milk on the basis of its fat content. As a result, the market price for the non-fat solids usually is but slightly more than the cost of concentrating or drying them.

Nutritionists would say our present ratio of values should be adjusted, but those who buy dried and condensed milks would undoubtedly object to an increase in the price of those products. Consequently, consumers will continue to pay a relatively high price for butter and a relatively low price for milk solids-not-fat.

Before the time of ready consumer acceptance of margarine, this was not so serious. But with a shrinking in per capita consumption of butter, due largely to the relative price of butter and margarine, the unequal pricing of butterfat and milk-solids-not-fat becomes a very important economic problem.

How much longer can, and should, butter carry a part of the load for the non-fat solids?

Proponents of "filled" milk, cream, and ice cream greatly profit by this situation through use of cheap, nutritive non-fat milk solids to build substitute products that sell at a much lower price level. These people should be required to pay more for the non-fat solids so that butterfat could be sold for less. This would place milk fat in a more favorable competitive position, with respect to the cheaper vegetable and animal fats.

The Substitute Problem

Our industry is faced with a very serious problem in the matter of so-called substitutes. By this is meant the substitution of vegetable or animal fats for the more expensive milk fat in such products as evaporated milk, butter, ice cream, and whipping cream. Sales possibilities of these products is a matter of record.

There are hundreds of consumers who will proclaim their belief in the merits of filled milk for infant feeding, cooking, and table use. Their favorable opinion is undoubtedly influenced by the saving of 1c. or 2c. per can. But the fact remains that enough consumers like filled milk to keep four large condenseries busy in the three states where its manufacture and sale is permitted.

The rapid increase in consumption of margarine in recent years again indicates the willingness of the consumer to accept this spread in place of the more expensive creamery butter.

Vegetable fats have been successfully used to replace from 50 to 100 percent of the fat in cream used for making whipped cream cakes. Some of the so-called cream, dispensed from cans under gas pressure, is made from vegetable fat, non-fat milk solids, flavoring, and sugar. This product is used largely as a topping on fancy ice cream servings and pies, and apparently is being accepted by the consumer. In some markets, there is now an all vegetable product that can be used for the same purpose.

Frozen desserts made in much the same manner as ice cream, except that vegetable or beef fats are used to replace milk fat, have appeared on some markets. Quality of many of these items has been inferior but, through the selection of the proper fats and other solids, a passable product can be made and sold at prices lower than those charged for ice cream.

More recently, a new cream-type product has been introduced on the west coast called "Enricher". It is made from emulsified vegetable oils. It can be used as a whipping cream or combined with reconstituted non-fat dry milk solids to produce a beverage simulating milk.

In formulating our policy regarding these ersatz products it is important that we proceed with caution. Bringing pressure through lobby groups may

TABLE IV—CHANGING CONSUMPTION of the Different Dairy Products

Per Capita Figures, 1909-1950, USDA

Year	Total Milk Pounds	Fluid Milk and Cream[1] Pounds	Butter Pounds	Cheese[2] Pounds	Evaporated Milk Pounds	Condensed Milk[3] Pounds	Dry Whole Milk Pounds	Dry Skim Milk Pounds	Ice Cream Gallons
1909	763	351	17.6	3.9	1.4	4.0	..	..	.3
1910	752	323	18.2	4.3	1.5	4.3	.01	..	.4
1911	743	309	18.5	4.1	1.7	4.7	.01	..	.5
1912	757	363	16.4	4.0	1.9	5.1	.02	..	.6
1913	748	350	16.3	4.4	2.4	5.5	.03	..	.6
1914	740	329	16.8	4.4	2.9	6.0	.04	..	.7
1915	745	326	17.1	4.3	3.3	6.2	.04	..	.9
1916	741	323	17.1	4.0	3.6	6.0	.04	..	1.0
1917	723	336	15.6	3.9	3.8	5.6	.04	..	1.1
1918	719	369	13.7	3.8	4.8	5.4	.04	..	1.3
1919	727	343	15.1	4.2	6.3	3.5	.08	..	1.4
1920	729	356	14.7	4.1	7.1	1.4	.07	.2	1.5
1921	761	354	16.1	4.1	7.7	2.1	.005	.2	1.5
1922	775	350	17.0	4.3	8.2	2.6	.02	.2	1.6
1923	780	336	17.7	4.3	8.9	2.5	.06	.4	1.7
1924	787	347	17.8	4.5	9.5	2.2	.05	.4	1.7
1925	792	347	17.9	4.6	9.1	2.5	.07	.4	2.0
1926	807	347	18.4	4.6	9.5	2.2	.09	.5	1.9
1927	803	347	18.0	4.4	9.4	2.2	.10	.7	2.0
1928	796	348	17.4	4.4	10.1	1.9	.08	.8	2.0
1929	803	351	17.2	4.6	11.1	2.4	.10	1.1	2.1
1930	813	350	17.2	4.6	11.2	2.3	.09	1.3	1.9
1931	833	347	18.0	4.4	11.4	1.9	.06	1.4	1.7
1932	830	351	18.1	4.3	12.3	1.6	.07	1.4	1.2
1933	813	349	17.8	4.5	12.3	1.4	.09	1.4	1.2
1934	812	333	18.2	4.8	13.4	1.5	.12	1.5	1.4
1935	799	336	17.1	5.2	14.6	1.5	.13	1.6	1.6
1936	792	341	16.4	5.3	14.0	1.8	.14	1.8	1.9
1937	796	341	16.4	5.5	14.9	1.7	.11	1.9	2.2
1938	796	339	16.4	5.8	15.5	1.6	.11	2.1	2.1
1939	824	343	17.3	5.9	16.2	1.5	.13	2.2	2.3
1940	821	343	16.9	6.0	17.4	1.8	.14	2.2	2.4
1941	808	352	16.0	5.9	16.7	1.7	.16	2.5	2.9
1942	839	371	15.8	6.4	16.3	1.9	.20	2.5	3.4
1943	762	394	11.8	4.9	17.1	1.7	.39	2.1	2.6
1944	775	411	11.9	4.8	13.7	1.9	.34	1.5	2.8
1945	804	432	10.9	6.6	16.2	2.0	.37	1.9	2.9
1946	813	423	10.5	6.7	17.0	1.5	.51	3.2	4.9
1947	787	398	11.2	6.9	18.1	2.2	.45	2.9	4.2
1948	750	387	10.0	6.8	18.3	1.9	.29	3.3	3.7
1949	760	385	10.5	7.2	17.7	1.9	.25	3.3	3.6
1950	774	393	10.8	7.3	17.8	2.1	.37	3.6	3.4

[1] Non-farm and farm combined. Includes cream in terms of whole milk equivalent. Series subject to revision on basis of special studies now in progress.

[2] All cheese except full skim, cottage, pot, and bakers'.

[3] Case and bulk.

gain temporary relief, but such a procedure is very likely to cause public opinion to turn against us.

Possibly we should consider the Chinese philosophy of conquering through absorption of the enemy.

We might be able to increase the consumption of milk fat as a spread by legalizing combinations of milk and vegetable fats that would result in a product superior to margarine, yet cheaper than butter.

The same thing, of course, could be done with other types of manufactured dairy products.

If combinations could be developed which would meet consumer acceptance, so far as taste is concerned, and which would meet consumer acceptthan those charged for regular dairy products, the total consumption of milk solids might be increased.

Legalizing of these combinations would be a great shock to many dairy leaders. Possibly there is a better solution to the problem, but we should not expect to be able to protect our interests entirely by legal restrictions and educational programs.

Arguments that better nutrition is possible by using milk and milk products unaltered in composition, or that soil fertility can be maintained only by keeping large herds of dairy cattle on our land, will have little influence upon the mass of people with limited purchasing power who are concerned primarily about their immediate welfare.

The savings made possible on food purchases without too great a sacrifice on the score of quality will be of much more interest to the economy-minded housewife with a large family to feed, clothe, entertain, and educate than is the role of dairying in a permanent system of soil fertility. Recalling Gresham's Law,* we might go along in much the same vein and say that cheap food is likely to make expensive food disappear. This is the biggest problem of the dairy industry today.

We must find some way to reduce differences in the relative cost of milk fat and vegetable and animal fats so that dairy products can better compete with the cheaper substitute products.

Better Butter Now

With milk production practically a constant, and with our population increasing steadily, a larger percentage of the milk supply is being used for market milk, ice cream, and cheese. Cream producers are becoming fewer in number, and many creameries are turning to broader diversification.

* The principle that less-valuable money has a tendency to push more-valuable money out of circulation.

Case of the Quarrelsome Bull

"We must learn more about the other fellow's point of view before we criticize him too severely—as in the story of the two travelers who crossed a field which was commanded by a rather quarrelsome bull.

"The bull gave chase and one fellow climbed a tree while the other one jumped into a hole. Then the bull moved on, and quickly the occupant of the hole emerged, whereupon the bull turned and chased him back into his hole.

"This happened several times, and finally the tree climber impatiently called to the other fellow: 'You fool, why don't you stay in that hole long enough for the bull to go away?'

To which the hole occupant replied: 'Fool, yourself—there's a bear in this hole!'

"If labor and capital could arrive at a similarly improved understanding of each other's problems, they might be able to settle their differences much easier and to their mutual advantage."—*P. H. Tracy*.

Some have actually closed their doors because of scarcity of cream.

Traditionally, the butter industry has been operated principally as the balance wheel of the dairy industry, receiving the milk and cream that was either not needed or not available to the other industries. Consequently, it was the first to suffer the effects of a national shortage of milk.

While this situation was developing there came about a change in the consumer demand for butter. The cheap buyer is satisfied with the substitute spread. The housewife who is less cost-conscious is willing to spend more for her spread but at the same time she expects quality merchandise. Accordingly, sweet cream butter or high scoring butter is in greater demand today than ever before.

Unbalanced Balance Wheel

As a result of these two forces—scarcity of supply, and an increasing demand for a high quality product—there may evolve a new butter industry. Instead of being a balance wheel, this may be a more stable industry engaged primarily in making a high quality product that can be sold to discriminating buyers at a reasonable profit. If the trend continues, whole milk creameries and sweet-gathered-cream factories are likely to become the principle manufacturers of tomorrow's butter.

It is an old economic law that in a highly competitive market profits tend to disappear. Therefore, as competition for the consumer's dairy dollar becomes greater, more and more attention must be paid to efficiency.

This accounts for the industry developments along certain lines, such as: (1) Centralization of operations in a few large milk plants rather than several small plants (made possible by the wide acceptance of the paper container and the smashing of public-health trade barriers built around our city milk markets); (2) continuous manufacturing methods, such as the continuous vacuum pan, ice cream freezer, high-temperature short-time pasteurizer, and churn; (3) automatic packaging of all dairy products; (4) in-place washing of pipe lines and equipment; and (5) replacement of milk cans with tank trucks for transporting milk from farm to plant.

Small margins of profit must be offset by greater volume per plant. To maintain even small margins, however, a minimum of labor must be used. Production per man-hour must be raised to a high level. Unless subsidized by the government, the submarginal manufacturer, who does not properly streamline his operations for maximum efficiency, will eventually fall by the wayside.

We are in an era in which the government is favorable to labor. Some entrepreneurs are concerned over the possibility of even greater power being granted the labor groups. However, it should be kept in mind that the laws of our country have been moving in the direction of better protection of one group against another.

No individual, or group, can long continue to exploit unfairly other individuals or groups before unfavorable public opinion brings about necessary corrections or reforms. This explains labor's recent growth in power.

As long as we have such a system for maintaining proper balances of power, neither organized labor nor capital need be feared. Labor and capital should learn to settle their differences in an orderly manner with proper consideration to both the interests of farmer and consumer.

Proper education and not government control is the answer to the problem of labor-management differences. More production per cow, and per man-hour on the farm and in the plant are equally important. To accomplish these things we must streamline our entire industry.

New Units Highlight Poultry Show

Faster operations, higher efficiency, and minimized labor are targeted by improved equipment displayed at recent Poultry Industry Conference in Kansas City

LLOYD E. SLATER
Assistant Editor, "Food Engineering"

Booth displays at the recent Poultry Industry Fact Finding Conference in Kansas City, Mo., were alive with evidence of new technical progress.

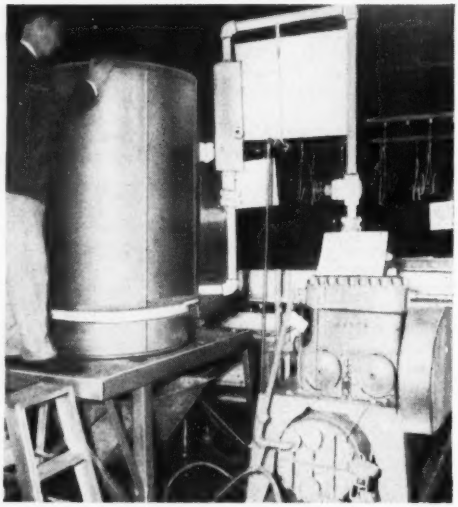
Exhibits of the large poultry processing equipment firms showed new automatic continuous-flow machines with engineering and sanitary design features inviting the attention of other food branches. In addition, these equipment makers were found offering engineering consultation services—a sure sign of being in tune with "machine-age" thinking.

Packaging innovations reflected an equal pace. New units for automatically bagging poultry, also ingenious carton developments, were shown. Special, more rugged, moisture-proof wrapping and packaging materials recently developed to augment product protection, were likewise accented.

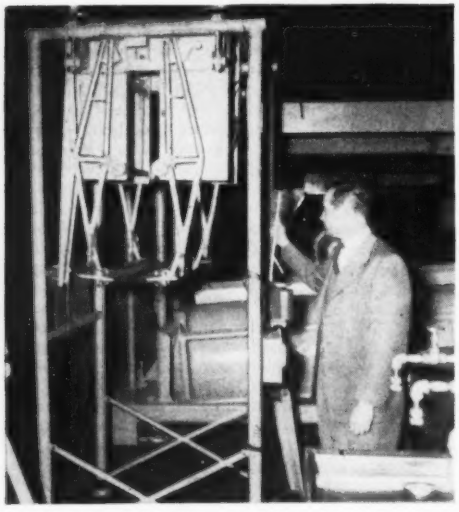
Overall Advanced Handling

Improvements in egg cleaning, candling, and grading were also noted. As in poultry processing, mechanization in the handling of eggs has zoomed to new efficiency.

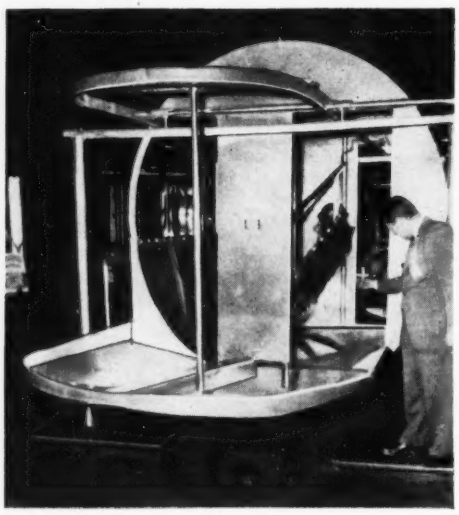
Technical papers at the conference were in parallel with the concrete progress demonstrated by the booth exhibits. Efficiency in handling poultry and eggs was the primary theme in papers and discussions which explored the various technics.



ICE MAKER displayed by Kent Equipment Co., Chicago employs no sprays, stuffing boxes, or seals. Unit makes 8 tons of chip ice per day using a 4-by-4, four-cylinder compressor. Ice formed on inside of drum is freed by internal rotating wedges. (84A)



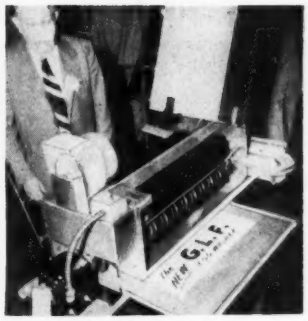
GARTER STRIPPER offered by Barker Poultry Equipment Co., Ottumwa, Ia., removes feathers from legs of inverted birds as they are conveyed between solid rubber gripping fingers. Maker reports 75 birds handled a minute in improved action. (84B)



EVISCERATED FOWL WASHER is newest unit in Gordon Johnson Co. (Kansas City) line. Employing a spray and squeegie type cleaning action, it banishes the need for manual scrubbing. Machine can handle 1,500 birds an hour. (84C)

PORTABLE CLEANER displayed by Albright Co., Chicago, makes steam with oil-fired 100-lb. pressure generator. Unit can be wheeled wherever hot water or steam is needed. (85A)

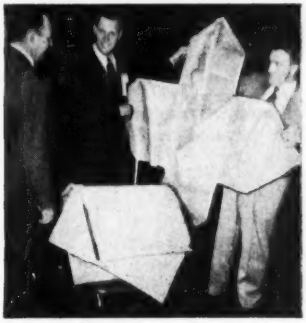
SNEED EGG GRADER, shown by Food Machinery Corp., Riverside, Calif., automatically sorts into four sizes and tabulates. Machine handles 50 cases of eggs per day. (85B)



G.L.F.-TYPE EGG WASHER seen in booth of Eaton Equipment Co., Omaha, cleans eggs as they spiral continuously past rotating wet nylon brushes. Rate: Four cases per hour. (85C)

SOUR EGG DETECTOR, shown by Alf McNamee & Sons, Oakland, Calif., employs principle of special light to spot souring in albumen. Off-quality is indicated by greenish fluorescence when egg is held to device. (85D)

CRY-O-VAC PACKAGER, displayed by Dewey & Almy, Cambridge, Mass., automatically draws a vacuum, twists sack, and applies a clip to bagged fowl. Operator controls vacuum and spinning action by foot pedal. (85E)



CARTON LINER, made in one piece (of die-cut parchmentized kraft and waxed papers) fits any size crate. Liner was shown in Kalamazoo (Mich.) Vegetable Parchment Co.'s booth. (85F)

CARTON FORMER, made by Waldorf Paper Co., St. Paul, Minn., automatically sets up 30-40 cartons per min. lined with cellophane. Exhibit showed unit's precise action. (85G)

VACUUM LIFTER. Maker (Hydra-Hone Equipment Sales Co., Milwaukee) states it automatically elevates turkeys and draws air from bag (3-6 in vacuum) all in one operation. (85H)

PLASTIC COVERALL, exhibited by Robert Mfg. Co., Chicago, is reported grease-acid, and blood-proof. Pliable, it can be washed, says maker, and does not crack. (85I)

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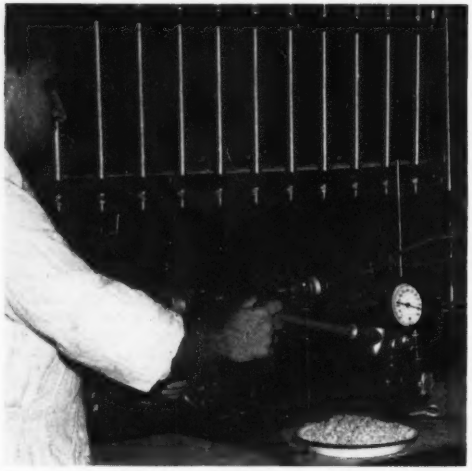
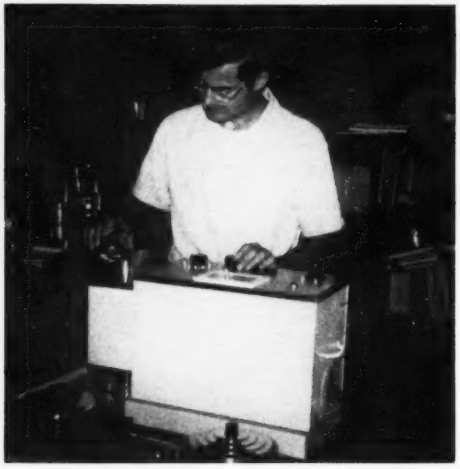
KEYSTONE OF NEW METHOD: Moisture Determinations



SUCCULOMETER gives quantity of extractable juice (in cubic centimeters) in sample of raw corn. Here, the author operates hydraulic pump that applies required pressure to sample.



STEINLITE tester gives percent moisture in solvent-extracted juice. Operator is seen pouring filtered solvent-juice mixture into cell of tester. He then reads meter and obtains actual moisture content from chart.

New Tri-Metric Test Predicts Canned Corn Quality

Results of three tests on raw products are combined to give U. S. grade of processed sweet corn. Accuracy not influenced by variety or climate

AMIHUD KRAMER
University of Maryland, College Park, Md.

Quality of processed sweet corn can now be accurately and quickly predicted by a combination test performed on the raw product. And the test is not affected by varietal differences or climatic conditions.

To perform it, moisture, pericarp, and kernel size determinations are made on the raw corn. Then, the results are referred to nomographs which indicate the U. S. grade of the canned product.

A Knotty Problem

During the last 30 years, numerous methods have been proposed for the objective measurement of quality of sweet corn for processing[1, 2, 3, 4]. However, not one of these methods has been found entirely satisfactory for all varieties under all conditions of soil, climate, and geographic location.

For this reason, a study was undertaken several years ago to determine whether a single method, or a combination of methods, might be developed that would accurately reflect the quality of processed sweet corn.

In the spring of 1949, and again in 1950, 108 plots on the research farm of the University of Maryland were planted in sweet corn—27 each of: Golden Cross Bantam, a yellow variety widely used for canning and freezing; Ioana, another yellow variety generally similar to Golden Cross Bantam; Narrowgrain Evergreen, a large kernelled, white variety; and Shoepeg, a small kernelled, white variety.

Nine plots of each variety were harvested at three stages of maturity, corresponding approximately to fancy, extra standard, and standard processing quality.

Immediately after harvesting, the corn was brought to the processing laboratories, where it was husked and cut on commercial type equipment, but without application of water. A portion of the cut kernels was removed for raw-materials analysis, and the remainder was washed, then canned or frozen in accordance with usual commercial practice.

The following determinations, in duplicate, were made on the raw, unwashed kernels: Moisture, by the vacuum oven[5], Steinlite[6], and Brown-Duvel[7] methods, and succulence by the succulometer[8] and shear-press[9]. Determinations made on processed samples were: Alcohol insoluble solids[5], succulometer[8], pericarp[5], and kernel size, by measuring the largest diameter of 20 kernels in inches.

Processed samples were also submitted to a sensory test panel consisting of 10 judges, who scored the

youngest, tenderest samples as 10 with less acceptable ones correspondingly lower until the oldest, toughest, were scored as 1. Two representatives of the Production & Marketing Administration, USDA, also scored these same samples.

Evaluation of Results

Precision of the test methods is shown in Table I. Standard deviation in each case is calculated by differences between duplicate determinations. It thus indicates, on the average, the error that might be expected (in terms of the values obtained for each test) when a single determination is made.

Relative precisions, in terms of percent, were obtained by dividing the standard deviations by their respective ranges.

Thus it becomes obvious that the most precise test for raw corn is the oven moisture method, and the least precise, the Brown-Duvel. It is also apparent that precision of the Steinlite method may be improved considerably if a large quantity of kernels is first ground into a uniform slurry and the 10 g. sample removed from it for analysis, rather than to use 10 g. directly as proposed by the manufacturer. Also, a uniform power-driven application of pressure, such as is possible with the shear-press, results in more precise juice extraction than is possible with the hand-operated succulometer.

Of tests used for the processed product, most precise is the alcohol insoluble solids method, followed by the succulometer (as applied with the power-driven shear-press), while the pericarp method is the least precise.*

Correlation coefficients between objective methods and human evaluations, as determined by the U.S. graders, are presented in Table II. It is obvious that where varieties were considered individually some of the methods were quite satisfactory. (Generally a correlation coefficient of .9 or higher is considered satisfactory.[10])

When data for all varieties were combined, the coefficients were reduced considerably in every case, indicating that values obtained with a given method do not mean the same thing in terms of human evaluation for all varieties. These results are entirely in agreement with previous work[8] where varietal and possibly climatic differences were stressed.

Combinations Tried

The above results indicated that no single factor (as the moisture content, succulence, pericarp content, or hardness) was responsible for the quality of sweet corn. Hence, two or more tests were combined and multiple correlations calculated to determine whether a suitable combination method could be found which might predict the quality of processed sweet corn regardless of variety or climate.

Some of these multiple correlations, presented in Table III, indicated that very satisfactory combinations may be obtained if, in addition to a moisture test such as Steinlite or succulometer, pericarp content and kernel size are also determined.

Using the Steinlite moisture method, the following multiple regression equation was calculated:

1. U.S. score for maturity of canned sweet corn = $6.44 + .530s - 5.396p - 1.261d$.

Where s is percent moisture, p is percent pericarp, and d is the sum in inches of the largest diameters of 20 kernels. ($R = .932$, and $R^2 = .869$.)

Similarly, using the succulometer to obtain the moisture value, the following multiple regression equation was calculated:

2. U.S. score for maturity of canned sweet corn = $38.10 + .474s - 6.075p - 1.581d$. Where s is the cubic centimeters of juice extracted by the succulometer, p is percent pericarp, and d is the sum in inches of the largest diameters of 20 kernels. ($R = .937$, and $R^2 = .878$.)

Testing the Equations

In connection with an earlier study, made in 1947, succulometer, pericarp and kernel diameter data were available on the raw products used to prepare 44 samples of canned sweet corn. Sensory panel scores for the canned

* Recent work at the New York State Agricultural Experiment Station indicates that precision of the pericarp method may be improved considerably by a minor modification.

Data Indicate Desirability of Combining Test Methods

TABLE I—POSSIBLE ERRORS Are Indicated by Objective Tests in Single Determination

Test	Mean	Standard Deviation of Duplicates	Range	Relative Precision, Percent
Raw Corn				
Oven moisture	70.00	±0.289	18.21	1.59
Steinlite				
Kernels	73.45	±0.731	16.00	4.57
Slurry		±0.440		2.75
Succulometer				
Hand operated	22.16	±1.00	17.65	5.68
Shear-press		±0.545		3.09
Brown Duvel	70.42	±1.140	18.59	6.13
Canned Corn				
A.I.S.	20.30	±0.234	17.95	1.30
Succulometer	16.38	±0.565	16.56	3.42
Pericarp	1.74	±0.245	2.47	9.91
Panel scores	5.43	±0.683	10.32	6.62
U. S. grades	27.80	±1.312	22.50	5.83

TABLE II—ACCURACY of Objective Tests Used to Evaluate Quality of Raw and Canned Sweet Corn Is Proved by Correlation Coefficients

Test	Golden Cross Bantam	Ioana	Narrow-grain	Shoepeg	All Varieties
Raw Corn					
Oven moisture	.918	.934	.910	.941	.702
Steinlite	.946	.943	.891	.949	.786
Succulometer	.907	.946	.831	.942	.697
U.S. raw grade	−.947	−.895	−.796	−.914	−.619
Canned Corn					
A.I.S.	−.966	−.933	−.861	−.946	−.819
Pericarp	−.865	−.889	−.914	−.905	−.769
Kernel size	−.781	−.896	−.813	−.776	−.304
Succulometer	.953	.941	.821	.939	.705
Panel scores	.946	.933	.944	.974	.940

TABLE III—QUALITY of Processed Sweet Corn Is Accurately Predicted by Combinations of Objective Tests on Raw Samples

Single Test	Alone	Combined With: Pericarp	Combined With: Pericarp Kernel Size
Raw Corn			
Succulometer	.697	.842	.937
Steinlite	.786	.877	.932
Oven moisture	.702	.845	.933
Canned Corn			
Succulometer	.705	.803	.912
A.I.S.	−.819	.866	.930

TABLE IV—IMPORTANCE of Kernel Size in Predicting Quality of Canned Product Is Suggested by Correlation Coefficients

Varieties	Number Samples	Succulometer	A.I.S.	Tri-Metric*
Large kernelled only	28	.91	.91	
Small kernelled only	16	.94	.96	
All	44	.78	.79	.962

* Equivalent U.S. scores as interpolated from Fig. 2 nomograph.

samples were also available. These samples consisted of eight varieties known to differ widely in quality. Results of correlations between succulometer values on the raw corn, and alcohol insoluble solids and panel ratings on the canned corn are shown in Table IV.

When varieties were divided into small- and large-kernel groups (on the basis of kernel size), the correlation coefficients were improved considerably. This indicates that kernel size is an important factor of quality, independent of succulence or solids content.

Using results obtained in the present study, U. S. scores were calculated for the 44 samples mentioned above on the basis of the regression equation (2), utilizing succulometer, pericarp, and size data.

When these scores were correlated with the panel ratings obtained in 1947, a coefficient of .962 was obtained. This further substantiates the probability that a combined determination of moisture, pericarp, and kernel size may predict the quality of processed sweet corn, regardless of varietal and climatic differences.

Practical Application

If the regression equations were to be used directly, they would entail three multiplications and addition. Hence, nomographs were prepared so that a straightedge could be used to arrive at the equivalent U. S. grade. The nomograph shown in Fig. 1 may be used with the Steinlite instrument, and that in Fig. 2 with the succulometer. For example, sample X has a Steinlite moisture value of 70.0, pericarp of 1.5 percent, and kernel diameter of 4.2 in. per 20 kernels.

Using Fig. 1, a straight line is drawn from 70 on the moisture column, through 1.5 on the pericarp column. When extended, this line reaches the conversion scale column at the value of 28. Then, when another straight line is drawn from 28 on the conversion scale column through 4.2 on the diameter column, it will reach the U. S. grade column at the value of 30, or minimum fancy.

Either the Steinlite or the succulometer method requires 5 to 7 min.

(*Turn to page 139*)

Nomographs and Charts Simplify U. S. Grade Determinations

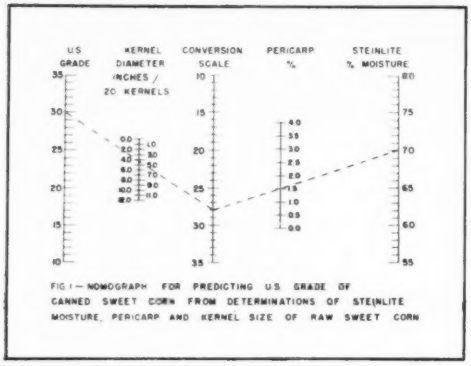


FIG. 1—NOMOGRAPH FOR PREDICTING U.S. GRADE OF CANNED SWEET CORN FROM DETERMINATIONS OF STEINLITE MOISTURE, PERICARP AND KERNEL SIZE OF RAW SWEET CORN

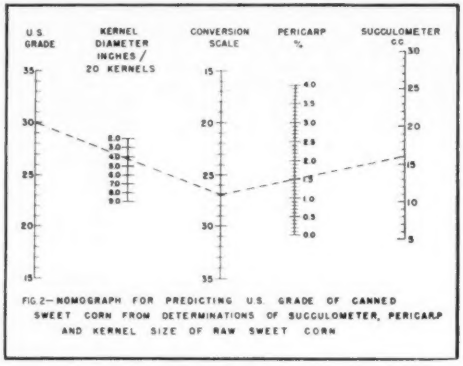


FIG. 2—NOMOGRAPH FOR PREDICTING U.S. GRADE OF CANNED SWEET CORN FROM DETERMINATIONS OF SUCCULOMETER, PERICARP AND KERNEL SIZE OF RAW SWEET CORN

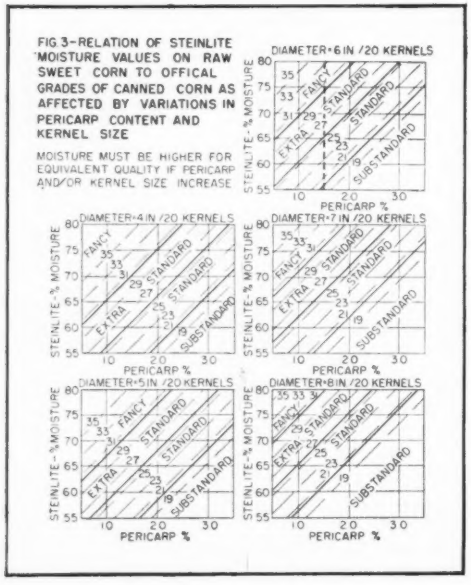


FIG. 3—RELATION OF STEINLITE MOISTURE VALUES ON RAW SWEET CORN TO OFFICAL GRADES OF CANNED CORN AS AFFECTED BY VARIATIONS IN PERICARP CONTENT AND KERNEL SIZE
MOISTURE MUST BE HIGHER FOR EQUIVALENT QUALITY IF PERICARP AND/OR KERNEL SIZE INCREASE
DIAMETER • 6 IN / 20 KERNELS
DIAMETER • 4 IN / 20 KERNELS
DIAMETER • 7 IN / 20 KERNELS
DIAMETER • 5 IN / 20 KERNELS
DIAMETER • 8 IN / 20 KERNELS
STEINLITE - % MOISTURE
PERICARP %
FANCY
STANDARD
EXTRA
SUBSTANDARD

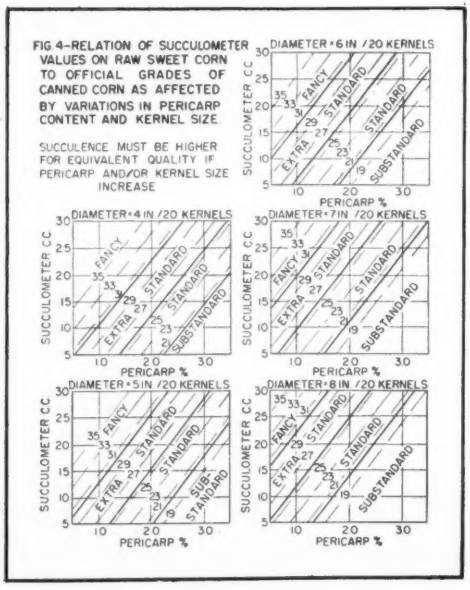
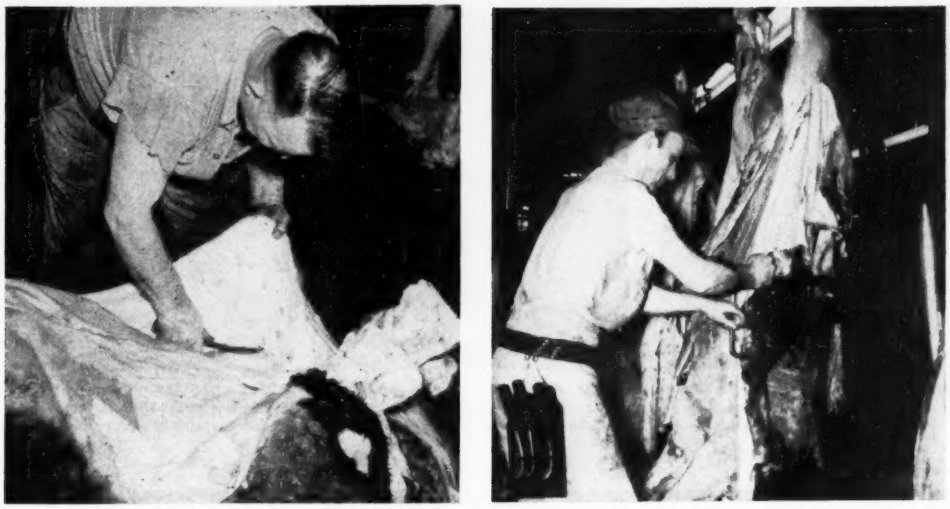


FIG. 4—RELATION OF SUCCULOMETER VALUES ON RAW SWEET CORN TO OFFICIAL GRADES OF CANNED CORN AS AFFECTED BY VARIATIONS IN PERICARP CONTENT AND KERNEL SIZE
SUCCULENCE MUST BE HIGHER FOR EQUIVALENT QUALITY IF PERICARP AND/OR KERNEL SIZE INCREASE
DIAMETER • 6 IN / 20 KERNELS
DIAMETER • 4 IN / 20 KERNELS
DIAMETER • 7 IN / 20 KERNELS
DIAMETER • 5 IN / 20 KERNELS
DIAMETER • 8 IN / 20 KERNELS
SUCCULOMETER C.C.
PERICARP %
FANCY
STANDARD
EXTRA
SUBSTANDARD

OLD "DOWN": Difficult work **NEW "UP": Job Simplified**



HIGHLIGHTING new system is hide-pulling operation that reduces physical strain on men by enabling them to work in upright position. Left: Former back-breaking job of siding carcass was done in a bending position with aid of only a conventional knife. Right: Special puller strips hide from carcass in matter of seconds.

Striking New Meat-Packing Progress—

Beef Dressing *On-the-Rail*

Straight-through Can-Pak system banishes tiring bending, stooping work. Special new equipment includes carcass marshaller, work-level platforms, mechanical knives, better bone cutters, and novel tail-and-hide pullers

JOHN V. ZIEMBA
Assistant Editor "Food Engineering"

Three Canada Packers Limited plants—at Winnipeg, Toronto, and Montreal—have now eliminated the laborious, dangerous tasks associated with floor dressing of beef.

Credited is a recent development in this packer's Winnipeg plant—a continuous, on-the-rail-dressing system featuring specially designed, labor-saving mechanical devices.

Called the Can-Pak system, it has brought new efficiencies on the beef-killing floor that can be compared with those originally attained by introduction of the monorail conveyor.

There are five outstanding advantages with the new system:

1. Simplification of tasks requiring manual labor.

The former back-breaking physical strain, characterized by conventional beef-dressing practices, has now been reduced to a minimum. All operations are performed by workers in an upright position, since shackled carcasses continuously travel along overhead rails. Thus, butchers no longer have to go through fatiguing, nonproductive stooping and straightening up motions as they did when working over carcasses on the floor.

2. Elimination of unnecessary waiting and carcass-handling.

With this "straight-through" system, four handling steps—pushing and guiding the shackled animal to the bleeding area, lowering the hoisted carcass onto the siding bed, pulling the animal to a half-hoist position, and raising it to a full-hoist position—have been eliminated.

3. Prevention of injuries to working personnel.

Operations are now much safer, since there is little danger of injuries due to wet, slippery floors or falling trolleys.

4. Production of better quality hides and sides of beef.

This is attributed to the development of a mechanical hide-puller that gives the carcasses a better appearance and eliminates cuts and "corduroys" in hides.

5. Reduction in floor-space requirements.

"Operating at a normal rate of 120 carcasses an hour, this system requires more rails than the conventional rail-and-floor method. However, since the skinning-bed area has been eliminated, overall space now occupied is approximately half of that

Changes That Simplified Dressing Chores →

1 STANDING on elevated platform, operator now works erect when skinning and removing right hind leg from animal.

2 TO PERFORM same operations on left leg, weight of animal is switched to free leg by pneumatic cylinder hoist.

3 HOOKING UP broken left leg is accomplished without any strain. Spread carcass is ready for opening, rimming.

formerly required for a bed layout slaughtering and dressing at the same rate.

Most notable among the many innovations marking the new system are an automatic carcass-marshalling device, raised working platforms, worker elevating platform for easy opening of hides, mechanical skinning knives, pneumatic-powered aitch-bone cutter, mechanical tail-puller, Can-Pak hide-pulling machine, brisket saw, and automatic scale.

There have been 13 distinct advances:

1—Improved Leg Shackling

First step distinguishing the Can-Pak system of dressing beef on the rail is shackling the animal. Dropped out of knocking pens, mallet-stunned animals now are shackled by the left hind leg rather than two hind legs. A manually operated electric hoist then raises the shackled animal so that it remains suspended from an overhead rail during the sticking, bleeding, scalping, heading, and front feet and right hind leg-removal operations.

As a precaution against shackle burns, cattle are secured above the hock with a specially designed shackle chain—one employing larger links of thicker metal.

2—Marshalling Device

Stuck animals are automatically fed onto the first rail—the bleeding rail. Employed is a company-designed, electronically-controlled marshalling device that eliminates the former laborious, slippery task of hand-pushing animals onto the bleeding rail.

Here's how this device operates: As the steers are lined up on the overhead rail in the bleeding area, a metal arm contacts the first shackle and moves the animals forward. Immediately, one of the steel fingers on the first dressing-rail chain belt hooks behind the shackle, and the animal is pulled onto the dressing rail. Timing of the marshalling device and chain conveyor are synchronized.

3—Raised Bleeding Rail

Only a slight change was made in operations involving scalping and removing the head and skinning and breaking the front feet. This involved raising the rail so that the workers could operate in an upright rather than a stooped position.

Front feet are removed in the usual manner, conveyed, and chuted to the processing department. Heads are removed with a knife, tagged, and delivered to the inspection station. Here, they are examined by government inspectors and held until corresponding carcasses have passed through the dressing operations and final inspection. Those heads passing inspection are processed according to requirements.

With operations completed on the first rail, the chain conveyor makes a 180-deg. turn. Carried out on the second rail are three operations—skinning and breaking the right hind leg, transferring the weight of the carcass to the right hind leg, and skinning and breaking the left hind leg.

4—Elevated Platform

The new system of skinning, breaking hind legs, and butting has done away with the former arduous stoop-

How It All Started

Initial inspiration for the highly mechanized Can-Pak beef dressing system was a remark by one of the rumpers.

"Why can't we get these jobs off the floor?" he said to the foreman. "If we do 'em while the carcasses are riding the rail, we'll be working with much less strain—upright rather than stooped—and the whole operation will be smoothed."

And later, the key operation—pulling the hide—was hit upon by another worker.

These ideas stimulated a detailed study of the individual jobs of leg breaking, brisket sawing, tail pulling, and weighing. Improvements followed, and finally continuous-on-the-rail beef dressing became a reality.

"Thus we got a system giving notable new advantages—on canners' stock as well as on prime steers," states L. T. Force, Winnipeg plant superintendent, who was prominent in guiding the development. "And all at an installation cost comparing favorably with the conventional method."

4 **THIS** pneumatically operated elevator (arrow) raises or lowers workers for opening different-size carcasses.

5 **RIMMING.** Working in an upright position, operator employs electrically operated knife to remove hide from sides.

6 **RUMPING.** Standing on the raised platform, worker now has carcass within easy reach as he plies his mechanical knife.

ing tasks. For the work is performed from a platform raised 6 ft. above the floor, instead of on the old skinning bed. Thus, workmen stand in a natural position, skinning and removing the right free foot in much the same manner as in dressing calves.

Butting follows while the operator is still on the elevated platform. Not only is stooping around the carcass eliminated, which characterized the former skinning bed operation, but the animal can also be easily swung into a handy position to suit the worker.

To perform operations on the left hind leg, the weight of the animal is now transferred to the skinned, broken right hind leg by means of a company-devised, pneumatically-operated (100 psi. pressure) cylinder hoist, controlled by two foot-operated switches. One switch raises and the other lowers the hoist.

The end of the cable fixed to the hoist is attached to the shackle, and the animal is raised about 2¼ ft. Then, a traveler (a hook attached to a trolley riding along a monorail) is secured to the broken right leg, the shackle is removed from the left leg, and the hoist is lowered.

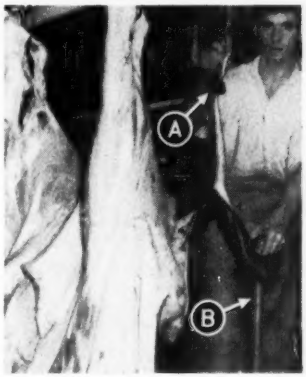
Now, hanging from the single traveler by the broken right hind leg, the carcass drops 30 in. on a sloping rail to the level of the main conveyor chain. This new level is at a height convenient for the operation of skinning and breaking the left hind leg, and then butting. Hanging freely from the traveler, the carcass can easily be swung to a suitable working position.

Power-driven saws replace the cleavers formerly used to remove hind feet from older, hard-boned animals—another task made easy for the butchers. Feet are tossed onto a moving belt that carries them to a chute for delivery to the processing department.

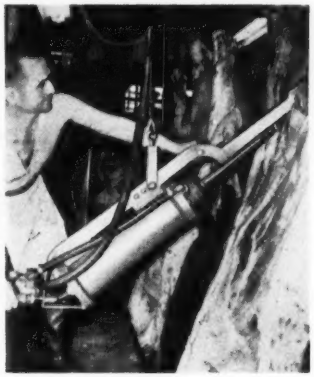
At the turn of the second rail (the next 180-deg. turn), the free hind leg is hooked to another traveler that rolls on a special conveyor riding 30 in. below the main rail. Thus, hooking this traveler to the left hind leg is accomplished without physical strain. Travelers for this leg are fed from above to the work station, and they glide to a stopper adjacent to the operator.

This special rail runs parallel to the main conveyor chain, and it gradually rises to the same level. When level, a pneumatically controlled rail switch automatically transfers the left

(*Turn to page 172*)

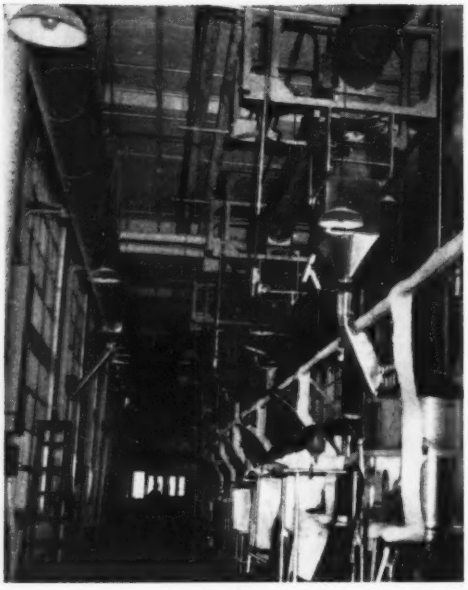


7 **TAIL-PULLING.** "Nothing to it." Worker hooks on flexible connector (A); air cylinder (B) does job.



8 **AITCH-BONE SAWING.** This pneumatic shear simplifies bone cutting, improves carcass appearance.

9 **BRISKET SAWING.** In no time at all, special pneumatic saw cuts brisket while carcass rides rail.



Spurs flow of raw materials to processing, and reaps these benefits: New speed with ingredients, maximum flexibility, economy of space, improved sanitation and work conditions

← **THIS** advanced bulk handling system in Schrafft's main syrup-cooking gallery moves sugar into automatic scale hoppers feeding kettles. Sugar handling is continuous—from sub-storage bins, to kettles, and back to bins.

By Accenting Advanced Handling

Schrafft's *Does It Better*

Part I—Ingredients

JOHN V. ZIEMBA
Assistant Editor, "Food Engineering"

When top planners at W. F. Schrafft & Sons Corp., of Boston, got together to map ways of boosting capacity their attention was soon concentrated on labor-saving modernization—and they lost little time in translating their findings into profit-paying action.

Most important improvement engineered to overcome troublesome bottlenecks in their confection-making process was the installation of faster, more flexible, and trouble-free equipment. Major additions and alterations involved existing materials handling systems which, though considered efficient as originally installed, were now not adequate to keep pace with the newer methods.

Efficient Sugar-Handling

At Schrafft's, costly manual movement of sugar—principal ingredient in the company's products—was eliminated some years ago by an advanced bulk sugar-handling system especially designed for flexibility. But recent improvements at the process end of the system have further enhanced efficiency.

The highly efficient handling system starts with the delivery of 34,000-36,000 lb. of sugar to the plant in specially designed, enclosed tank trucks. On arrival, these vehicles are tilted by built-in hydraulic equipment to feed the sugar directly into a company designed, horizontal, swivel-type spiral conveyor.

This receiving conveyor carries the sugar to a vertical chute, to be picked up by another horizontal spiral-type conveyor. Next, a bucket elevator lifts the sugar 130 ft. to bulk storage—an enclosed facility on the 5th-floor roof. Sugar then drops onto a horizontal belt that is equipped with magnetic metal separators. Three horizontal spiral-type conveyors now evenly discharge the sugar into various sections of a rectangular metal storage bin with pyramidal bottom. Capacity of this bin is 80,000 lb.

Horizontal spiral conveyors running along the 5th-floor ceiling carry sugar from the bulk-storage bin to three sub-storage hoppers, each holding 24,000 lb. There is also a direct outlet from the bulk-storage bin to an

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***Right* Handling Equipment for *Right* Job**

This first of two special articles on Schrafft's streamlined confectionery operations reveals how fully mechanized raw materials handling units slashed costs and provided the pivot for multiplied output. Specifically detailed is the new efficiency attained through automatic movement of sugar, corn syrup, cocoa beans, and chocolate—fast, safe, and with foolproof performance.

The concluding article—to apear in a following issue—will spotlight the role of engineered handling in advancing reliability and flexibility in the candy-making operations, as well as in the packaging of the varied items.

automatic scale hopper on the floor directly below. From this hopper, a spiral conveyor feeds the sugar to weigh stations in the adjacent hard candy, caramel, and nougatine departments.

From the three sub-storage bins on the 5th floor, spiral and bucket conveyors carry the sugar to three feeding systems:

First sugar-feeding system: This is continuous, and consists of scale hoppers installed during the postwar years. A spiral conveyor along the ceiling of the 6th floor feeds the sugar into eight scale hoppers in the main syrup-cooking gallery. In turn, each hopper dumps 50-lb. batches of sugar into 1,000-lb.-capacity, stainless steel, steam-jacketed cooking kettles. Another spiral conveyor returns excess sugar to the sub-storage hoppers.

Automatic delivery of any number (up to 20) of 50-lb. batches of sugar into a kettle can be fixed by the cooking personnel. Thus, if a batch in a kettle calls for 900 lb. of sugar, the operator merely sets the dial index at "18" on a control panel (there is one control panel for each scale). Then, 18 50-lb. batches of sugar are automatically dumped from the scale hopper to supply the kettle.

Batching can be repeated after the cooked syrup is discharged from the kettle, without any further adjustments. Thus, the same number of 50-lb. batches can be automatically weighed and dumped into a kettle by merely pressing a pushbutton.

Second sugar feed: Actually a part of the first system, this is of recent installation. Sugar is cut-off from the end of the spiral-type conveyor going to the main syrup-cooking gallery, being thus by-passed at this point into another automatic scale hopper that empties into a spiral conveyor feeding three floor-level bins. The latter supply sugar to the caramel, toffee, marshmallow, and cream-cooking departments on the 5th floor mezzanine.

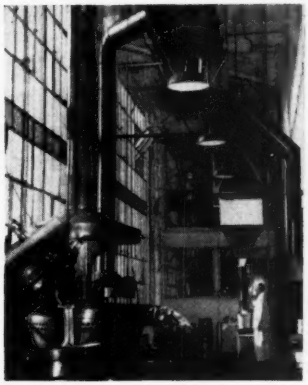
Automatic feeding of sugar into the floor-level hoppers can also be preset by adjusting a dial on a control panel.

Third sugar-feed: By action of the last of the three systems, sugar is next spiral-conveyed to 6-in. pipes, then fed by automatic scales into high-speed super-disintegrators. Attached to each of these latter micropulverizers is a combination centrifugal-pneumatic separator. This device balances centrifugal force and air velocity in order to collect the properly graded sugar and return the remainder to the pulverizer.

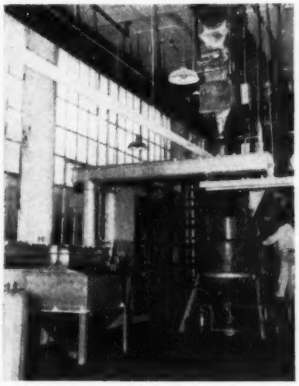
Finely pulverized sugar is automatically batch-weighed into mixers, in

Top Speed Is Attained Through Bulk Sugar Handling

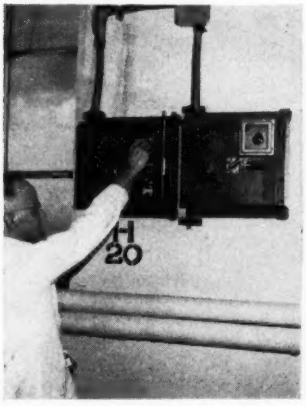
GOES IN FAST. Truck is tilted to deliver 36,000 lb. of sugar into plant.



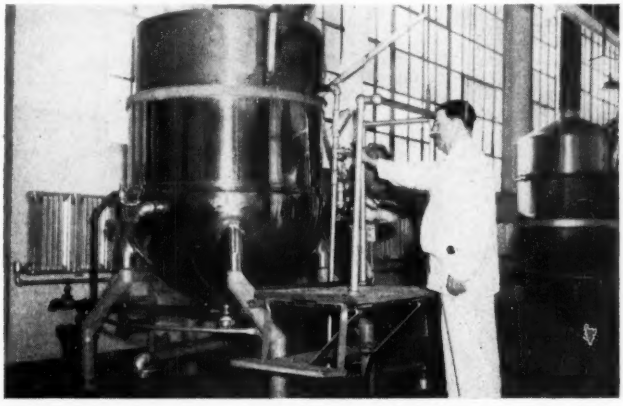
FROM main storage bin, sugar is directly fed to hard-candy process.



SUGAR is cut-off from conveyor in cooking gallery, chuted to floor below.

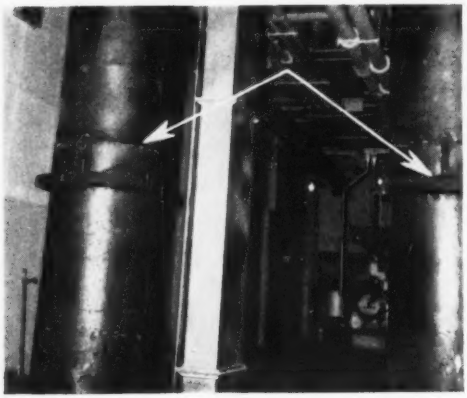


OPERATOR sets dial on panel to feed sugar from scale hoppers.

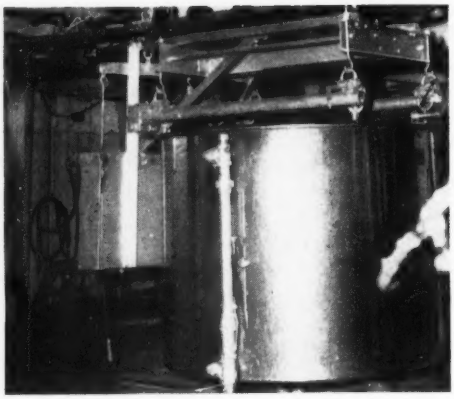


CORN SYRUP is pumped through insulated, heated pipes and metered directly into jacketed kettles in main syrup-cooking gallery.

How Units Whisk Chocolate Ingredients to Process



IN THESE company designed units (arrows), cocoa beans are roasted as they are gravity-fed to next operation.



MOBILE HOPPER moves chocolate liquor from overhead storage tanks to processing vats on the floor below.

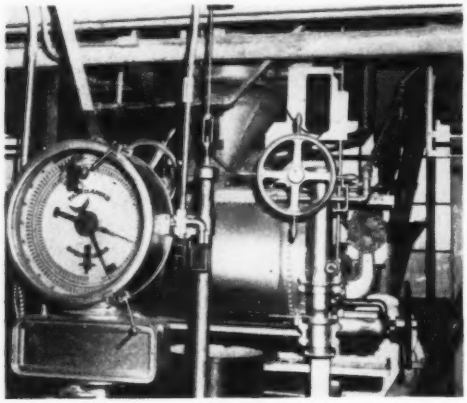
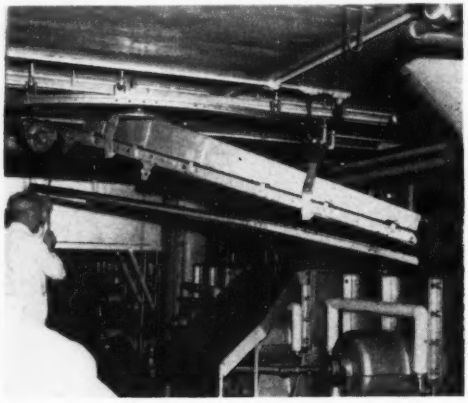
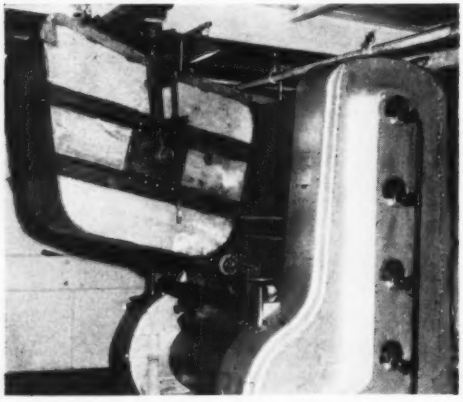


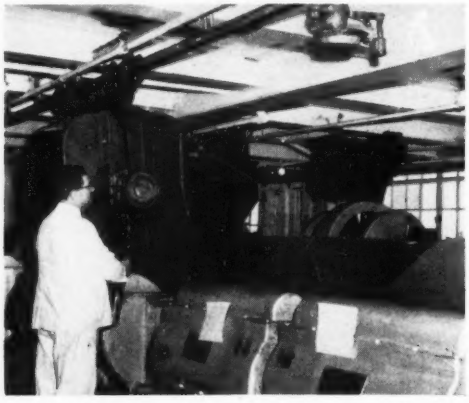
PHOTO-ELECTRIC type control-scale automatically batch-weighs pulverized sugar, which is then fed to mixers.



SWIVEL-TYPE conveyor, mounted on circular monorail, moves chocolate from mixers (floor above) to process tanks.



MONORAIL-MOUNTED tilting bucket carries chocolate from process tanks (floor above) to refiners.



TILT BUCKETS are also employed to transport chocolate from the many refiners to conches.

which it is blended with chocolate liquor and cocoa butter to produce coatings for use in the enrobing machines.

Syrup Metered Into Kettles

Efficiency in the handling of another major item—corn syrup—was also achieved earlier by pumping the ingredient from storage tanks through insulated, heated pipes throughout the plant. Then recently, metering stations were added to the system.

This syrup is delivered from tank cars equipped with steam coils. The discharge pipe from a tank car is hooked up with a 6-in. dia., 8-ft. long swivel-type metal pipe that swings out from beneath the receiving platform to meet the car. Pre-heated by the coils, the syrup is pumped via an insulated, 8-in. pipe into a 12,000-gal. metal storage tank enclosed in a heated room on the 1st floor.

Next, the syrup is pumped into 2,000-gal. sub-storage tanks located on the 6th-floor mezzanine. From here, it is continuously circulated through insulated and heated pipes to points of use at the various cooking stations and back to sub-storage tanks. Automatic delivery of corn syrup into cooking kettles is accomplished with meters.

Handling of cocoa beans is particularly well engineered at Schrafft's. The beans are now delivered to a separate storage building on pallets—16 bags (150 lb. each) to a pallet. Fork-lift trucks stack them four pallets high. Total capacity of this storage building is 4,000,000 lb. of cocoa beans.

Sanitary Steps

Here, precautionary measures are taken to keep insects out of the main processing plant. First, the beans are fumigated with either methyl bromide or hydrocyanic gases. From cylinders set outside of the sealed building, these fumigants are fed in through ½-in. copper pipes suspended from the ceiling. Spray heads, spaced 15 ft. apart, emit the gas into the room. At the same time, three unit heaters (started from inside the building) circulate the gas.

After about 18 hr. of fumigation, ventilators are opened from the outside and two fans (started from outside the building) exhaust the gas from the room at the rate of 20,000 cu. ft. per min.

Now begins the first in-process handling of cocoa beans—which we will detail to the final step when the finished, refined chocolate coating is pumped to the enrobing machines.

Pallet loads of fumigated beans are moved by lift truck to the picking and cleaning station. Bags are opened and the beans are dumped into a floor-level hopper. A bucket conveyor next elevates them to a cleaner, where an air and screen separator frees them of

(Turn to page 135)

LETTERS TO THE EDITOR

F&DA Claims Confusion On Condemnations

Editor, FOOD ENGINEERING:

Our attention has been called to your article "'Just in Case' Tips on Condemnations" (page 81, Oct. '51 FE). We would like to add a footnote to it, dealing with several points which seem to have confused manufacturers in the past.

First, the article says that "F&DA can, if necessary, condemn a product, issue warnings and fines, and bring criminal suit under the Act." We have no such summary powers. All our actions, except warnings, must be filed in the Federal courts by United States attorneys, and it is the courts which decide whether a product should be condemned or a defendant fined. All actions provide opportunity for trial by full judicial process.

The title of the article refers to "condemnations," but much of the text has to do with criminal prosecutions under the Act. A court can order condemnation only in a seizure case, which involves only the particular lot of the product which was seized. The end result of a criminal action may be a fine or jail sentence, but would not be a "condemnation."

The author states that the "inevitable consequence of failure to appear (at a citation hearing) is criminal prosecution." This is not correct. Failure to appear at a hearing does not automatically lead to prosecution. While it is our policy to cite a prospective defendant only when we have reason to believe that he should be prosecuted, we reserve decision until the field office makes its final report, including any facts brought out at a hearing.

The author is quite right in recommending that it is a good thing to appear at such hearings. The hearings are not public, and we are prohibited from giving out any publicity about them.—*Wallace F. Janssen, Assistant to the Commissioner, Federal Security Agency, Food & Drug Administration, Washington, D. C.*

Author's Interpretations

Editor, FOOD ENGINEERING:

We should like to add a postscript to Mr. Janssen's footnote—

First: We did not maintain that the F&DA could summarily fine or condemn any product without a full judicial hearing. In fact, two paragraphs after the sentence in question we state, "And *if convicted*, the first offense violator may be imprisoned for one year and/or fined. . ." A conviction can only take place in a court after both parties have presented their evidence and the court has found the defendant guilty.

The F&DA is the agency recommending the prosecution and furnishes the necessary witnesses and testimony at the prosecution, although legally the proceeding is brought in the name of the United States of America by the U. S. Attorney. Both the F&DA and the U. S. Attorney are the agencies representing the U. S. Government.

Second: We agree with Mr. Janssen that the end result of a criminal prosecution may be a fine, jail sentence, or *acquittal*, and that it would not be a condemnation. The title of the article, not of our choosing, was designed to acquaint the non-technical reader generally with the subject.

Third: We believe that the statement about the inevitable consequence of a failure to appear at a hearing is correct. In our opinion, Mr. Janssen is confusing the meaning of "inevitable" with "automatic". They are not synonymous. The purpose of a hearing is to afford to a prospective defendant, whom the government believes should be prosecuted, an opportunity to demonstrate why this should not occur.

If the prospective defendant does not appear or answer, the field office is hardly in a position to report any extenuating facts. Under the circumstances, this leads to criminal prosecution, not because it is automatic but simply because no evidence has been adduced by a prospective defendant to dissuade the F&DA from recommending prosecution.—*Joseph Winston, Member of New York and Federal Bars, Ridgewood, N. Y.*

BLENDING TANKS (top) in this air-conditioned laboratory are used to age essential oils and extracts that give Dr. Pepper its distinctive flavor. When properly aged, they are drawn by gravity into compounding tanks above.

Modern Units Keyed for Functional Flow

Make Quality Syrup *En Masse*

Formula-perfect 5,000-gal. batches of beverage syrup surge continuously from high-capacity sanitary equipment in new Dr. Pepper Co. Dallas plant

FE STAFF

If you are an alert processor bent on keeping your operation ever abreast business-wise, then it stands to reason that you are constantly weighing the production values and dollar economics of installing improved equipment and adopting latest technics.

Thus, when you seek to raise plant efficiency and accelerate output to meet growing demand, you are open to operation changes.

Not, however, at the expense of quality. True yardstick of progress on the line is its maintenance of established product excellence.

This is pertinently exemplified in the outstanding syrup operation at the Dr. Pepper Co. Here, plant preparation has evolved as fast as the times, yet the product has remained the same, its basic formula unchanged over the 60 years since its origination. The initial syrup was carefully compounded in small beakers and mixed in 40 gal. crocks. Today, with the same syrup flowing to hundreds of thousands of retail outlets, the quality product surges from the production lines in hourly 5,000-gal. batches.

In modernizing and swelling its syrup facilities to attain this huge output, the company could not chance methods which might allow even subtle changes in the long-established product. Accordingly, the process planners always work under a vital check-leash.

In 1948, with the completion of

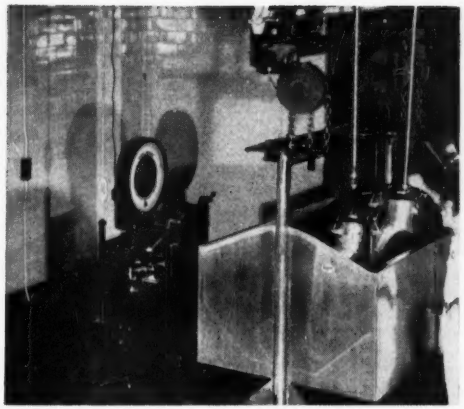
How Advanced Engineering Assures a Top Product

—is detailed in this second special article of our three-part series on the superlative Dr. Pepper operation.

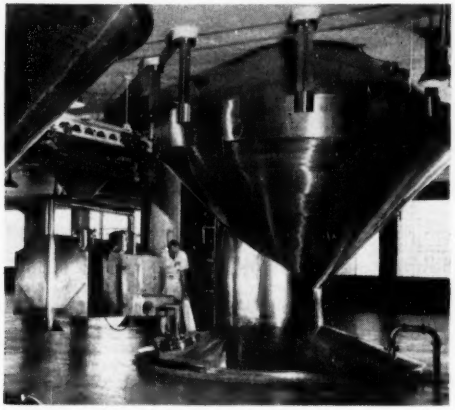
The careful planning and practical implementation that built the company were described in the initial feature—"Big Beverage Success," page 101, Feb. FE.

How Dr. Pepper carries out precision quality control will be recounted in the final article, scheduled for an early issue.

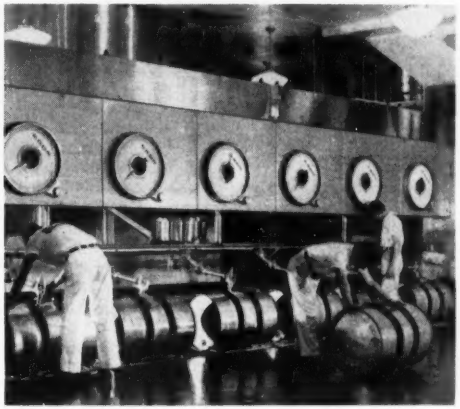
SACKS of sugar are dumped into hopper, suspended from 3rd floor, as first step in syrup preparation—290 one-hundred-pound bags to batch.



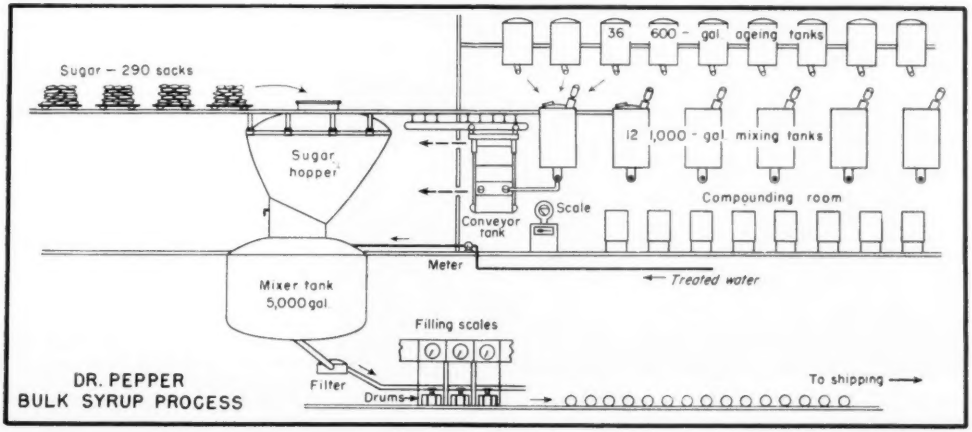
FLAVOR, color, and acid for one 5,000-gal. batch are weighed in this tram-rail mounted conveyor tank, which is then moved into syrup room.



WATER is metered into mixing tanks set in 2nd floor, then sugar is dropped from hopper (top). Later, flavors are run in from conveyor tank (rear).



FINISHED SYRUP is scaled into 55-gal. stainless steel drums in this 1st floor room. Filling is semi-automatic, about 2 per min.



its new plant in Dallas, the company put into operation a large-scale syrup process specially designed to meet the requisite double objective—maximum throughput, but with no sacrifice in quality.

Some of its innovations are—

- **A gravity-flow tri-level concentrate compounding laboratory.**
- **A "traveling" concentrate weigh-tank that assures batching-in accuracy.**
- **Massive, stainless-steel, sugar hoppers integrated with syrup mixing tanks.**
- **Multi-drum, semi-automatic syrup filling and weighing racks.**

In Dr. Pepper's new process, units are functionally oriented for making up the basic 4,500-gal. batch of 57 deg. Brix sugar syrup each hour. For this a high quality granulated sugar is used and no heat is applied. A cold process is preferred because it provides control over such factors as inversion and caramelization. And dry sugar is utilized to eliminate completely any likelihood of yeast contamination—a condition easily sponsored in sugar solutions by hot Texas summers.

Capacity Primary

Sugar arrives in boxcar lots of 100-lb. multiwall paper sacks. These are palletized—56 on a platform—and moved to third-floor storage by means of Yale & Towne Worksavers. Two of these lift trucks are employed to unload cars and the third takes the pallets aloft.

When used to capacity, the sugar storage area holds 35,000 sacks—contents of about 35 boxcars.

In a central location, amid the pallets of stored sugar, are two cup-like sugar chutes. These are the tops of stainless steel sugar hoppers which are suspended to the floor below. In preparation for a syrup batch, 290 sacks of sugar are dumped through these chutes into the sugar hoppers.

A gate valve, that is controlled through direction of the foreman on the floor below, opens to discharge the sugar into two 5,000-gal. stainless steel mixing tanks. These latter units are integrated directly below the hoppers, with tops almost flush with the mixing floor level. Both hopper and mixing vessels were specifically designed for the process and built by Alloy Fabricators, Inc., Perth Amboy, N. J.

Before sugar is added, however, the mixer tank is loaded with treated water—pumped in through automatically operated Bowser meters after passage through an Infilco water conditioning system. A huge bottom-driven turbo-mixer is started and sugar added while this is running.

Total time for filling the sugar hopper and dissolving a batch is about one hour. Near the finish of mixing, a 500-gal. quantity of Dr. Pepper syrup concentrate—also made up in about one hour's time in the compounding lab—is blended in. In the barrel filling operation on the floor below, approximately 55 min. are required to empty a batch, and the mixing tanks are operated in sequence. So the system provides a continuous flow of product to the shipping department.

Flavor concentrate is produced in a three-level, air-conditioned compounding laboratory. Of stainless steel, all mixing and blending tanks in this area are set in permanent, through-floor locations. The flooring throughout is rubber and asphalt tile.

Ingredients for the concentrate are stored in quantities that will supply the process from two to five years. Aromatic natural flavors for the formula are specially housed in a temperature-controlled vault at the top level of the laboratory. Large inventories of spices, phosphoric and citric acid, caffeine, and caramel color are stored in paperboard drums, in bags, and in stainless steel barrels as originally shipped.

First step in the compounding and blending of the essential oils and extracts is the ageing of processed ingredients in 600-gal. tanks on the top level of the laboratory. Thirty-six such tanks are available for ageing and blending these formula constituents up to 12 months.

Upon completion of several phases of ageing and blending, these essential oils and flavors are gravity-fed—through quick connecting stainless steel piping—into 1,000-gal. agitator-equipped compounding tanks set in the floor below. Twelve of these are kept in various stages of fullness and the finished extract is drawn from them as needed. Mixing in the compounding vessels starts slowly and gradually increases, with time and speed carefully controlled.

Contents of 1,000-gal. compound tanks are now filled into 55-gal. stainless steel portable drums. A mobile elevator lifts these to tank discharge-valve level and also drains the drums in subsequent operations.

Final step in concentrate make-up occurs in a unique double-section conveyor tank which travels on an overhead tram-rail to the syrup processing area. This unit is moved into the laboratory and onto a weighing section of the tram-rail which is suspended opposite the dial of an associated Toledo scale.

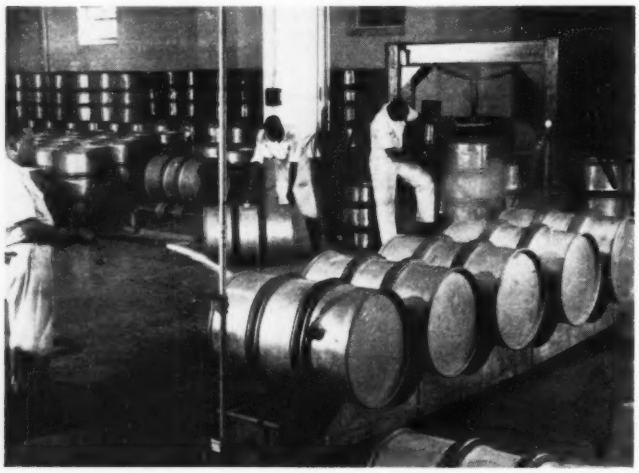
Into the conveyor tank go drum contents, caramel from tank storage, and water. Also, a solution of phosphoric and citric acids is added through stainless steel pipe from tanks on the floor above.

Filling In Banks

From compounding operations, the loaded 500-gal. conveyor vessel is rolled into position over a connecting spout in the 5,000-gal. syrup tank and its contents are slowly poured and blended into the simple syrup. Before the finished syrup is released to the barrel fillers, however, tests are made for standards of taste conformance, Baumé, and acidity.

Filling takes place on the floor be-

(Turn to page 137)



RETURNED DRUMS are scalded internally on rack (foreground). Dents are removed by tapping water-filled, air-pressured drums with rubber maul.

WITH unsafe, loose loads "out", it's smiles now as Author Prebish (left) and an assistant check lading.

"We Stopped *Damage Claims*"

It took just two moves, says West Coast food shipper: 1) Use of cars fitted with load-locking device, and 2) block stowing of cartons

RAY PREBISH
Traffic Manager, Van Camp Sea Food Co., Inc., Terminal Island, Calif.

Shipping-damage claims have been slashed to virtually zero since we made two major modifications in our methods.

The first shift, here at Van Camp Sea Food Co., Terminal Island, Calif., involved adoption of box cars equipped with a car load-locking device that eliminates conventional dunnage.

In the second major change, we put in the "bonded-block" method of stowing our cartons of sea food in box cars, as approved by the Assn. of American Railroads.

Where we were averaging about $50 worth of claims per day when using the former box cars loaded in the ordinary way, we have yet to file a claim for a shipment made in one of the modified cars.

One of the prime jobs of any industrial traffic manager is to make sure the products reach their destination as quickly, as cheaply and in as nearly perfect condition as possible.

Quality Is Stressed

It is an important function of my department to see that our tuna, sardines, mackerel, and other products, reach the buyer in the same top condition as they leave our packing plants. Yet, as any food shipper knows, a lot of miscellaneous and expensive damage can happen to shipments before they find their way to the grocer's shelves.

No shipper is in business to support the reclamation warehouse's sales of damaged goods. In our own case, sea foods that had left our plants in perfect condition found their way to these "rummage sales" of industry because they arrived at their destination dented, broken, scuffed up. The contents of the cans were still good enough, to be sure. But we don't care to display our product on shelves in anything less than A-1 condition.

About two years ago, we made a thorough study of this damage-in-transit problem and came up with the two changes in question. Since October, 1950, we have loaded more than 50 new-type box cars equipped with the loading device. This equipment* is designed, built, and installed as a permanent part of the car.

Equipment Described

Here is how the device works: Steel-reinforced wood cross members can be locked into longitudinal car wall members. Cross member end fittings have two steel fingers that are spring-locked into perforations spaced ½-in.

* Called DF (damage-free, dunnage-free) Loader. Maker: Evans Products Co., Plymouth, Mich.

apart along the tops of the wall members. These wall members or "belts" are approximately 1-ft. apart from floor to roof and run the length of the car from door to car end along both walls, thus giving a wide variety of adjustable load-locking combinations.

The cross members can be used both to lock the load tightly into position and as supports for decking if the load is to be compartmentized in tiers as well as in solid stacks.

When not in use, these members can be secured by their own locking at the roof or on the floor at either end of the car. Since the "belts" do not protrude from the walls, the car can, if the need arises, be used as an ordinary carrier for such bulk cargo as grain.

Advantages Cited

Following are some of the advantages we have found in using the belt-equipped cars:

The cars permit us to get more lading and still leave the doorways clear to maneuver our fork trucks. After one stack of cartons has been loaded, we use some of the slatted deckboards—part of the load-lock equipment—as bulkheads locked into position against the load with the cross members.

To build a second or third tier, other deckboards are laid down over the supporting cross members and additional stacks can be loaded without subjecting the floor-level cartons to any pressure, since the weight of upper tiers rests on the cross members, not on the cartons beneath.

Our loads run from 60,000 to 100,000 lb., and only rarely do we load in the door area. This method not only makes it easier for the consignee to get into and out of the car but also provides a place for the bracing equipment. About 90 percent of our shipments are "stop-off" loads, and the easy access means faster overall rail shipping.

Our loads are rarely made up of cartons or containers of the same size. Further, we also ship fish oil in drums and fish meal in 100 lb. bags. We have found that these specially equipped cars have still further advantages because the load can be quickly built with these "stop-off" points in mind. Thus, the need for building or dismantling time-consuming and wasteful conventional wood dunnage is eliminated.

Load-Building Detailed

Use of the car loading equipment coupled with the bonded-block method of building our loads has resulted, I am sure, in our victory over the two major enemies to good shipping—poor loading and damage in transit.

We've been using the bonded-block loading method for nearly two years and have found that its more solid riding qualities are further enhanced by the load-securing abilities of the loading equipment. Bonded block loading is especially advantageous with the stop-off loads.

In essence, here's how we built them: Where possible, cartons of the same size are placed in bonded block pattern—a row of cartons running lengthwise across the floor of the car; the next layer on top of that loaded crosswise; the next lengthwise, etc.

When such a load has been built, it is secured by a deckboard used as a bulkhead and locked into position tightly against the load with two or more or the cross members. Then we are ready to build the next load toward the car doorway.

There are several approved bonded-block patterns, but the purpose of all is to distribute the weight of one layer on another, and to divide the load into sections, thus restricting lengthwise shift.

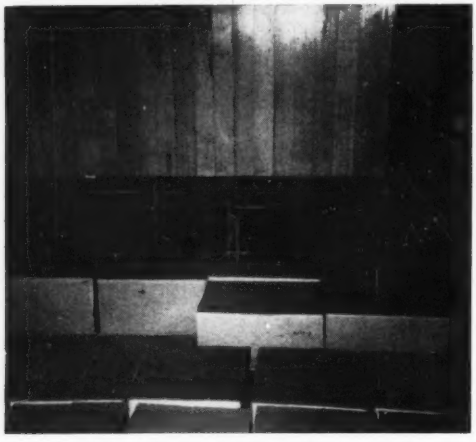
When a freight car is in motion, there are three kinds of movement to which it is subject: Lengthwise, crosswise, and vertical. The lading in turn gets the same treatment. If improperly loaded, cartons take on a "sawtooth" pattern instead of remaining solidly upright. When this takes place, you can expect to find damaged cartons—and damaged contents. "Sawtoothing" means that the load was not tightly packed and the car's motion opened up a slack or play between the components of the load.

We were interested in the findings of a recent survey among West Coast canners. Sponsored by the California Terminal Railroads in cooperation with the AAR, it revealed that only 26 of the 72 canneries polled used bonded-block loading, and only a half dozen of those 26 were building really good, tight loads.

A part of that survey also dealt with the use of the correct size of carton for canned food. Cartons whose top flaps do not meet are no better than those whose top flaps overlap. We

(Turn to page 141)

Loads are "blocked-in" . . .

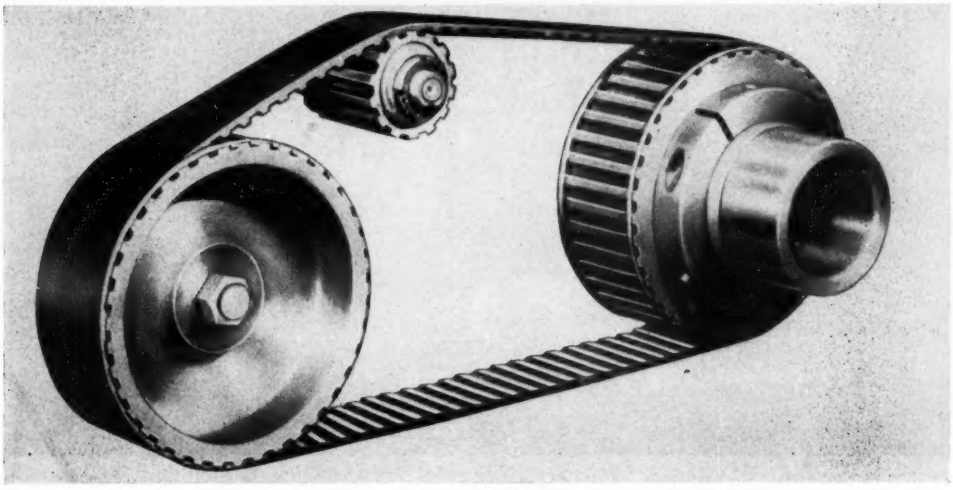


HERE, first tier of canned-fish consignment depicts how cartons are stacked in "bonded-block" pattern.

. . . then locked like this

LATER, shipment is tightened by slatted bulkhead (above) braced by cross members locked to built-in wall belts.

NEW EQUIPMENT & SUPPLIES



New-Type Positive-Drive Transmission Belt

Slip, creep, speed variation—all three are reported eliminated in power transmission with use of this belt.

Called the "Timing" belt, it features revolutionary tooth-grips for making positive engagement with grooved pulleys. Patented design produces a positive belt drive that does not depend upon frictional grip for transmission of power. Thus, power-source and belt-delivery speeds are the same.

Pulling element consists of a helically-wound steel cable that gives the belt high tensile strength. Further, this cable eliminates the stretch problem. Pulling element is imbedded in Neoprene, which makes the belt highly oil- and heat-resistant.

Wire-cable construction permits belt to operate on fixed centers without take-up adjustments. Belt can be installed and removed by hand. Since there is no stretch, no tensioning of belt is necessary. In design of drive, low initial tension feature in many cases effects substantial economy.

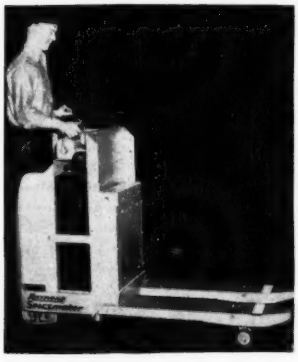
Light weight of the belt reduces centrifugal effect, permitting speeds in excess of 15,000 fpm. Size of belt can be varied to provide for any hp. requirements.

Belt's flexibility permits pulley diameters as small as 2 in. at 10,000 rpm.—even with a comparatively heavy load. Belt functions on drives where idlers are required and horsepower can be readily taken from back of belt.

In operation, the belt teeth enter and leave the pulley grooves in a rolling manner, minimizing friction.

The drives may be purchased complete. For differing pulley installations, maker's engineering department will supply specifications.—*L. H. Gilmer Co., Div. of U. S. Rubber Co., Tacony, Philadelphia 35.*

Circle 101A on Reader Service Card



Handy Rider-Type Truck

Both single and double face pallets can be handled by this new rider-type, low-lift electric truck.

Known as the SpaceMaker Low-Lift, it is designed to speed work by enabling operator to ride while picking up and delivering unit loads. This rider-type truck travels up to 5 mph., carrying 4,000 lb. loads; up to 6 mph. empty.

Highly maneuverable, vehicle can right angle, pick up, or spot loads from aisles 6 ft. wide. Maneuverability, together with truck's light weight, enables unit to be used in low-capacity elevators, on lighter capacity floors, in trucks, and other cramped areas.

It is offered with a carrying frame 30-60 in. long and 24 in., 27 in., or 30 in. wide. Overall length of power unit and riding areas is 28 in.

The forks, 9½ in. wide, may be raised from 3¼ in. (lowered height) to 7¼ in. (elevated height). Truck employs a 12v. battery, having a standard battery compartment measuring 8½ in. x 29 in. x 31 in.—*Lyon-Raymond Corp., Madison St., Greene, N. Y.*

Circle 101B on Reader Service Card

Mechanical Bean Picker for Canners

Of particular interest to the bean processors is the highly encouraging test performance of this new type mechanical picker.

Results on trial plots during the past year have warranted the building of five machines (all under lease agreement) for commercial use during the 1952 season. And it is hoped that quantity production may be launched for next year's crop.

Incorporates Dual Units

The unit was basically patterned by a N. Y. State canner, and development was then commenced by the maker early in 1950. New machine, which weighs about 3,000 lb., is a two-row picker mounted on a four-wheel tractor. Operation is via the tractor's power take-off.

Picker is reported most adaptable to a Farmall C tractor by reason of its narrow width. Before mounting, a few minor modifications are necessary.

Two sets of shoes are located between the front wheels, each set picking one row of beans. Gathering chains with lugs are located in the shoes, which guide the plants along to the picking reels located one on each side of the tractor, beside and below the engine. The reels are comprised of eight bars arranged horizontally in a circle. Each bar contains 15 stainless steel fingers.

A plant topper is located in front of the picking reels to cut off excess tops. A central conveyor runs underneath the tractor and is connected to a series of fans at the rear of the machine. Two men stand on a platform at the back of the tractor and fill shipping bags from two discharge hoppers. This makes a total of three men on the unit, including the tractor operator.

In picking, the series of fingers combs through the plants. After the plants are topped above the upper pods, the picking reel commences to strip them. The reel turns so that the fingers strip the plant upward.

The reel turns about two to three times faster than the speed of the tractor. Though relatively stationary, the picking bars are spring loaded and will turn slightly if they strike a firm object. The reel is sloped downward to the rear so that picking commences at the top of the plant and works down as the machine progresses.

One Pass Best

Only one picking is advised, because after the reel has combed a plant, it is not capable of further practical production. Picked beans are dropped on a single conveyor (underneath and in the center of the tractor) that elevates them through air ducts and removes most of the extraneous plant parts and soil. After cleaning, the beans are fed by a double conveyor into two discharge hoppers, to which are attached the field bags.

Blowers on the picker are not capable of removing all foreign material, particularly rocks. A special cleaner, designed for this purpose, features a device for separating bean clusters and removing the occasional stones gathered by the reels. This cleaner is part of the canning factory line.

1 Acre Per Hour

A tractor speed of 1.9 mph., or ¾ throttle in first gear, is presently recommended for most efficient picking. At this speed, the unit handles 1 acre per hour under average conditions. A 36-in. row spacing, with a seeding rate of 60 lb. per acre, has been found most satisfactory.—*Chisholm-Ryder Co., Inc., Niagara Falls, N. Y.*

Circle 102A on Reader Service Card

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard just inside the back cover. Then sign at the bottom and mail. No postage is needed.

For your convenience, too, all items in this department are listed and keyed in the Reader Service Section.

Conveyor Belt Is Washable, Odorless

An improved all-Neoprene conveyor belt designed especially for the food industry has been announced.

Called Supertex, the belt is stated to be odorless, tasteless, and non-toxic, also washable, oil-proof, and waterproof. It is also termed resistent to acids, alkalis, and heat. Construction is of multiple plies of light-weight woven duck to give greater strength combined with less stretch. This reportedly reduces failures from metal fasteners pulling out.

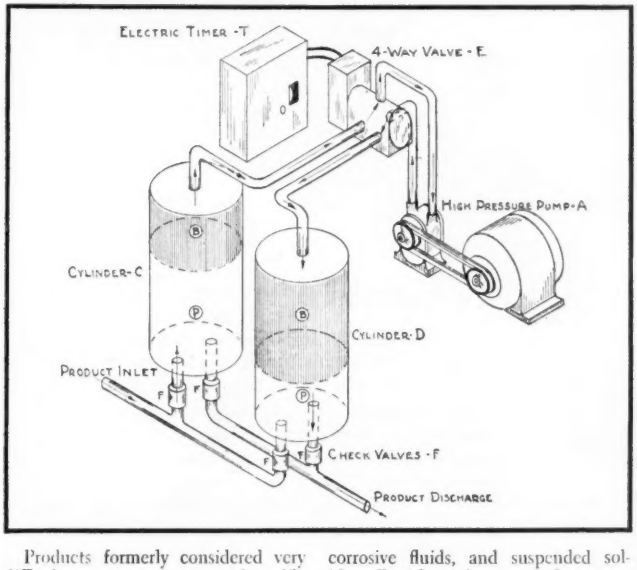
Belt has a smooth top cover stated to leave no impression regardless of material conveyed, due to its being calendered and press-cured the same as heavier conveyor belting.

Made with full-width fabrics, belt is not folded and it has no splices. Its flexibility enables it to run over small pulleys. It can be made endless without sewing. A vulcanized multiple-step lap is used which is reported to last as long as the belt itself.

Belt is offered in two types, heavy and standard. They are identical except for the cover thickness. Former is $\frac{1}{4}$ in. and latter .010 in. Both types are available in widths up to 48 in.—*Baldwin Belting Inc., 74 Murray St., New York City 7.*

Circle 103A on Reader Service Card

New Pump Handles Highly Viscous Materials



Products formerly considered very difficult to pump are reported readily transferred by a new type unit.

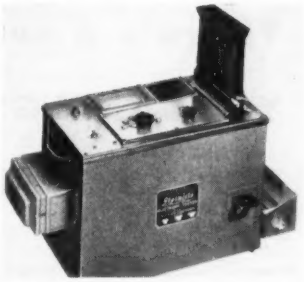
Called the Hydrex Pump, it employs two fluid pistons. Referring to the diagram, a high pressure pump (A) moves hydraulic fluid (B) alternately to and from cylinders (C) and (D). And a four-way hydraulic valve (E), actuated by a solenoid (T), controls the fluid direction. Cylinders are made of stainless-steel (or other materials where required).

Pump is designed to handle slurries, very viscous pastes, abrasive or corrosive fluids, and suspended solids—all without damage to the pump. Action is positive, yet termed so gentle that delicate food products, such as whole strawberries and cherries, are moved without injury. Where contact between pumping medium and product must be avoided, a suitable membrane is provided.

Unit is described as simple and sanitary. There are no bearings, mechanical pistons, packing glands, valves or impellers in the cylinders.—*Manton-Gaulin Mfg. Co., 65 Garden St., Everett 49, Mass.*

Circle 103B on Reader Service Card

For Quickly Determining Grain Moisture Content



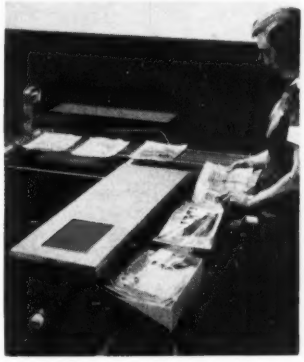
This Model 400G electronic tester with built-in thermometer is reported to make moisture tests faster and easier.

Compacting of sample is not necessary, thus it can be readily poured out after testing. This advantage saves scraping out and makes possible one test after another. Further, the sample is not destroyed, hence it can be re-tested if desired.

Unit can test corn up to 47.2 percent moisture. Its wide moisture range is seen of distinct value to grain men. High accuracy of readings is cited.—*Seedburo Equipment Co., 734 Converse Bldg., Chicago.*

Circle 103C on Reader Service Card

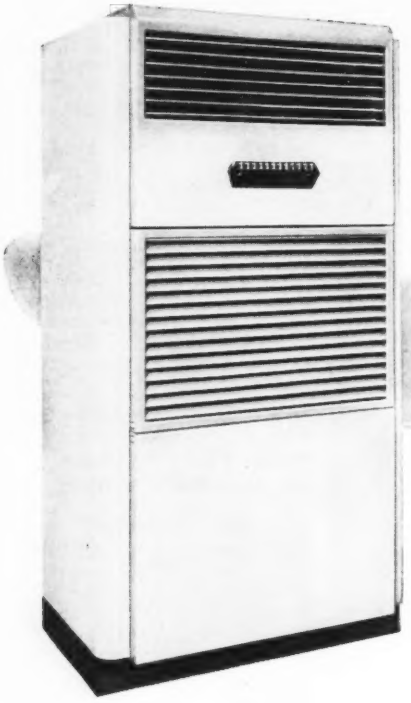
Handy Package Sealer Ups Operator's Output



Faster manual packaging of sliced bacon in pre-formed cellophane envelopes is claimed when employing this new Speedpak machine. It is reported to enable a single operator to package 500 lb. per hour.

Designed to form a tight, sanitary heat-sealed package, unit is a light-weight, easily portable assembly.

There's a superb WESTINGHOUSE UNITAIRE® CONDITIONER in the size you need...



available now...

... through your Westinghouse Air Conditioning Distributor. The UNITAIRE is completely factory-assembled and ready for use. Installation is simple and fast. It does not require hard-to-get materials. These units are adaptable, too. They can be applied singly or in multiple to condition anything from a single room to an entire floor or building.

Best of all, the UNITAIRE is the best looking, most reliable air conditioner you can buy. One reason is the famous Westinghouse hermetically-sealed compressor. There are other important reasons your Westinghouse Air Conditioning Distributor will be glad to explain. Call him today; he's listed in the Yellow Pages of your telephone directory. Or, write for free booklet to Westinghouse Electric Corp., Air Conditioning Division, Hyde Park, Boston 36, Mass.

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YOU CAN BE SURE... IF IT'S **Westinghouse**

Placed next to a conveyor line or slicing machine, it requires only one operator, who transfers the portions of sliced bacon into the pre-formed cellophane envelopes by means of a former. Package is heat-sealed in one motion.

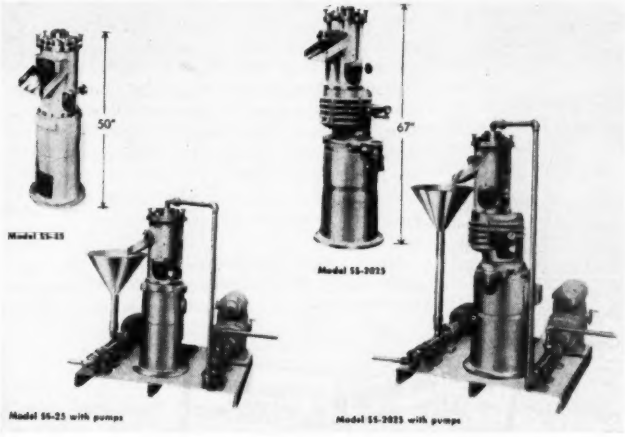
Maker states that in one packing plant using the new units, two female operators now package the same amount of sliced bacon that previously required five operators.

The equipment has an overall height of 38 in., length 35 in., width 20½ in., and requires 6 sq. ft. of floor space. Working surfaces are stainless steel, and legs are of rust-resisting cadmium-plated angle iron. Equipped with extra heavy duty rheostat heat control, the unit plugs into an ordinary 110v. receptacle. There are no moving parts.

Units are reported quickly adaptable to right-hand or left-hand operation. And interchangeable 1-lb. and ½-lb. fixtures can be attached speedily. Construction is sanitary and crevice-free, and conforms with B. A. I. specifications—*Modern Equipment Co., P. O. Box 3596, Greenville, S. C.*

Circle 103D on Reader Service Card

New Stone Mills Have High Capacities



Improvements in design and operating features have upped the capacities of the SS-25 and SS-2025 high-speed, vertical stone mills designed for processing all types of prepared mustard, pepper sauces, and other condiments.

The new, 20-hp. SS-2025 unit has a plant-proven capacity of 2,000 gal. per 8-hr. day. Model SS-25, 10-hp. unit has capacity of 800 gal. per 8-hr. day.

In both machines, the mill proper and all moving parts and accessories (including plumbing) that come in contact with product being processed are made of acid-resistant stainless steel. The polished processing chamber is stated to meet all sanitary requirements.

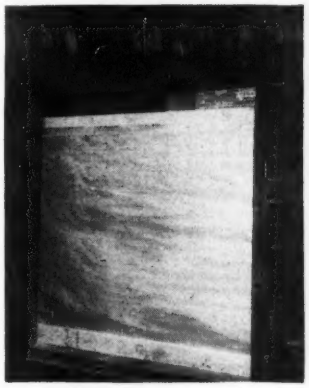
Mills are stated to make it easy for operator to control end-product quality and volume. Each mill can be provided with constant-velocity type pumps, operated by appropriate motors, for moving the mash from the pre-mix tanks to mill or from mill to storage tanks or filling machines. An external hand-wheel controlled micrometer adjusting device permits the rotor stone to be raised or lowered. One full turn of hand wheel brings 1/1,000 of an inch change in rotor stone elevation. Partial turns thus permit control within very close limits.

Carborundum Co. has collaborated with the maker in the development of several types of non-contaminating stones for manufacture of prepared mustard. All moving parts in mill proper are contained in one easy removable assembly. Shaft, upon top of which rotor stone turns, is splined at both ends, is supported by two thrust bearings, and is connected to motor by a flexible coupling to give positive radial alignment that makes fine grinding possible. Flexible coupling also prevents thrust loads on the motor.

Mill Model SS-25 has a shaft speed of 3,600 rpm. Mill SS-2025 motor speed is 3,600 rpm. on 60 cycles, but mill proper has speed of 5,400 rpm. Latter speed is obtained by means of step-up gear assembly. Gears are helical type, and shafts are forged integral in one piece units.—*Morehouse Industries, 1156 San Fernando Rd., Los Angeles 65.*

Circle 105A on Reader Service Card

Car Coopering Speeded By Single-Piece Doors



Reduced shipping and handling costs are promised those who ship in bulk with use of new "One-Piece, One-Man" retaining doors.

With only rudimentary training, states maker, an inexperienced employee, working alone, can cooper a 6-ft. door in 12 min. Further, the new door expedites unloading and simplifies cleanup.

Construction is of strong steel strapping, spaced between laminations of heavy-duty kraft liner board. Only a hammer is needed to put up the door. Strapping is perforated to speed nailing. Double-headed, easily removed nails are used.

Weighing only 10-lb. each, doors are nevertheless exceptionally strong. They are stated to greatly reduce dunnage weight.

Doors are easily stored out of weather and occupy a minimum of space. Twenty-five 6-ft. doors come in a crate 7½ ft. x 2½ ft. x 5 in. They are termed unaffected by moisture, mildew, freeze, rot, or vermin.—*Signode Steel Strapping Co., Railroad Sales Div., 2600 N. Western Ave., Chicago 47.*

Circle 105B on Reader Service Card

For Increased Consumer Appeal...ENRICH!

ENRICHMENT costs so little. Yet few product improvements offer food processors who use cereal grains a better opportunity for public service while gaining—at the same time—positive sales advantages. Today, the benefits of Enrichment are so obvious that *enriched foods* have become *preferred foods* in the eyes of millions of American housewives.

To enable the food processor to reap the double benefit of public service and consumer preference, Merck makes a wide variety of Vitamin Products. Specially formulated to meet the different enrichment requirements for white flour, white bread, corn meal, grits, macaroni, spaghetti, noodles, pastina, and other cereal products, these Vitamin Products are the culmination of almost two decades of pioneering experience in the research and production of pure vitamins.

Merck Vitamin Products for Enrichment are preferred for their uniformity, dependability, and ease of use.

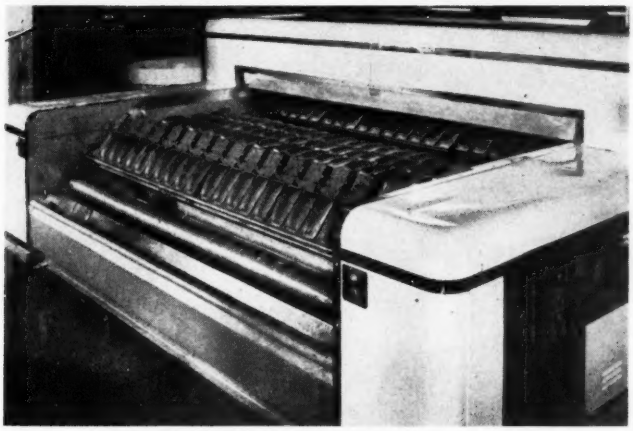
Merck Vitamin Mixtures, Wafers, and Pure Ingredients

FOR YOUR ENRICHMENT PROGRAM

Research and Production for the Nation's Health

MERCK & CO., INC.
Manufacturing Chemists
RAHWAY, NEW JERSEY
In Canada: MERCK & CO. Limited—Montreal

Automatic Unit Speeds, Simplifies Depanning



Bread unloading and depanning, from either grill hearth-type or tray-type ovens, has been made completely automatic by this new equipment.

Unit saves approximately 1½ man-days per shift. In bakeries where normal production is on a 16-hr. basis, this machine reportedly will save 24 man-hours per day.

Receiving the baked bread in the pan-straps at the delivery end of the oven, the unit unloads the straps and delivers the bread to a take-away conveyor, or directly to cooler shelves. The empty pan-straps are delivered to a second conveyor, where they are generally carried to a pan-cooling conveyor system.

In operation, the pan-straps are discharged from the oven hearth onto the roller bed of the depanner. This bed serves as a reserve magazine and a table upon which the pan-straps are accurately aligned. From the table, the pans are released and emptied to the receiving cooler shelf, which is below the automatic oven unloader and under the floor.

For releasing the pan-straps, metal fingers (see photo) come up through slots in the dump table and grip the pans while the table tilts upward and forward. When the table has completed its forward motion, the bread drops out of the pans, over a steel roll, and into the receiving chute. Bread is released from the chute only when a cooler tray is in correct position below the chute to receive it.

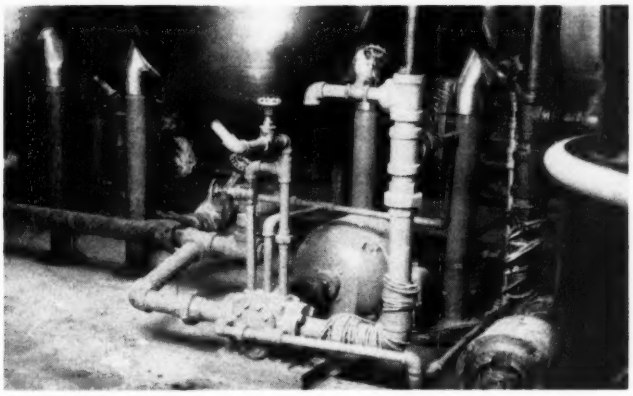
After the bread has left the pan-strap, the dump table reverses its motion and turns past the receiving position to a point even with the side discharge pan conveyor, under the roll bed. The pans then slide off the dump table and are carried from the machine to any one of a number of different pan-conveying systems.

The equipment is partially controlled electronically, release of the bread pan-straps from the roller bed to the dump table being governed by an electric eye. Actual operation of dump chute and dump table is by a series of cams.

Capacity of the unit is approximately 9,000 loaves of bread per hour.—*Read Standard Corp., 3191 Casitas Ave., Los Angeles 39.*

Circle 107A on Reader Service Card

Steam-Jacketed Gear Pump for Hot, Viscous Liquids



Special design features are stated to make this steam-jacketed, herringbone gear pump well suited for handling viscous liquids at high temperatures. Example in food plant is moving of fats and oils from tanks to kettles.

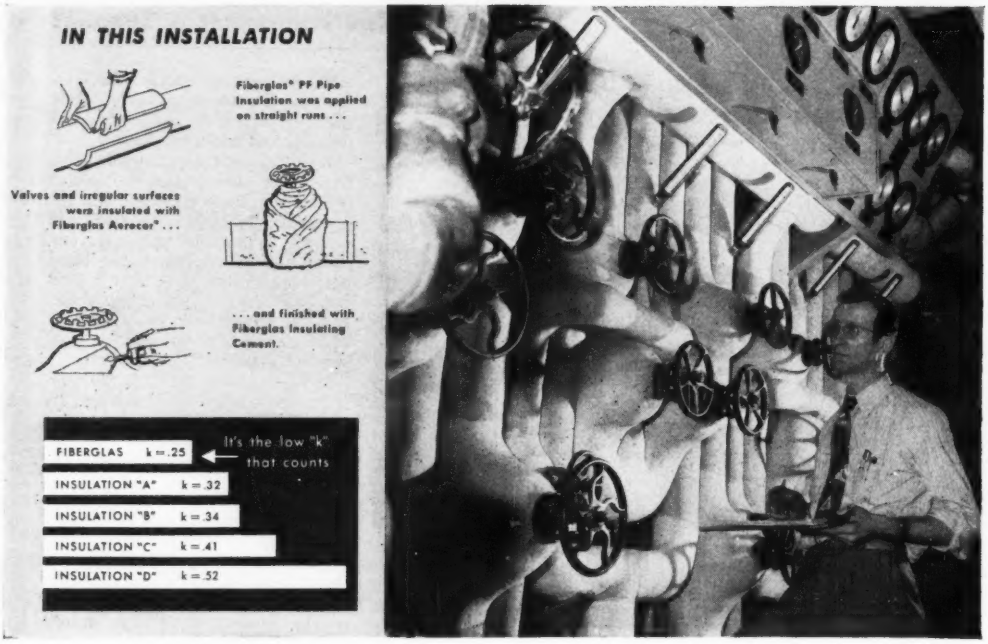
The steam jacket completely covers the internal parts to insure even thermal distribution. Inlet, outlet, and cover flanges are cast integral with the pump base.

Rigid construction aims at elimination of any distortion due to pipe strain or misalignment, and straight bore housing is designed to avoid shaft deflection and bearing overhang. Steam connections on pump jacket are readily accessible and permit a variety of piping arrangements. Rotor and bearings assembly can be removed as a unit by releasing the coupling and taking off the rear cover.

Gears are case-hardened, press-fitted and keyed to the shaft to prevent lateral or radial movement. To prevent slippage, gear teeth have a specially designed high-pressure angle tooth.

Built in standard sizes from ¼ to 8-in., pumps can handle any liquid free from solids. Capacities range to 1,000 gpm.; pressures to 500 psi. Pumps are available in Mechanite B, cast steel, bronze, or special alloy case. —*Schutte & Koerting Co., Cornwells Heights, Pa.*

Circle 107B on Reader Service Card


IN THIS INSTALLATION
Fiberglas® PF Pipe Insulation was applied on straight runs . . .
Valves and irregular surfaces were insulated with Fiberglas Aerocor® . . .
. . . and finished with Fiberglas Insulating Cement.
It's the low "k" that counts
FIBERGLAS k = .25
INSULATION "A" k = .32
INSULATION "B" k = .34
INSULATION "C" k = .41
INSULATION "D" k = .52

Save up to 25% more BTU's per dollar with Fiberglas PF Pipe Insulation

It's the "k" that counts. Fiberglas® PF Pipe Insulation is first in efficiency among molded materials for service up to 450° F. As the little chart above shows, the low heat conductivity "k" of Fiberglas Insulation gives superior protection when equal thicknesses are used . . . or in many cases you can use less thickness than with other insulations to obtain equal protection. Either way your costs are lower.

Fast, easy application is another way Fiberglas PF saves money. Available with canvas jacket for indoor use, or with weatherproof jacket for outdoor. *New form* is Fiberglas Dual Temperature Pipe Insulation. Its laminated jacket provides an integral vapor barrier for indoor lines that carry hot water one season and cold water another; or for continuous low-temperature service.

Where heat or cold must be controlled, count on these unique features of Fiberglas Industrial Insulations to produce top results . . . in less time, at lower cost:

- High insulating value
- Light in weight
- Easy to cut and apply
- Economically priced
- Ageless, rotproof
- Non-corrosive
- Low moisture pickup
- Will not shrink

Your Fiberglas Insulation Contractor is ready to put these advantages to work for you. For his name, see the yellow pages of your phone book, or call the nearest Fiberglas Office. OWENS-CORNING FIBERGLAS CORPORATION, Dept. 99-D, Toledo 1, Ohio.

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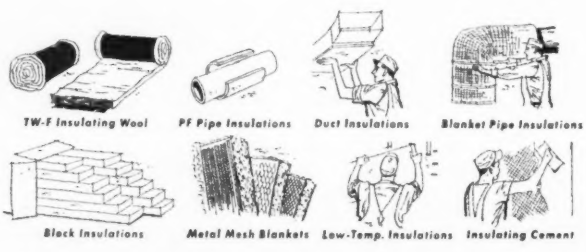
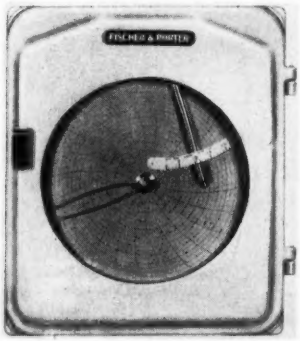
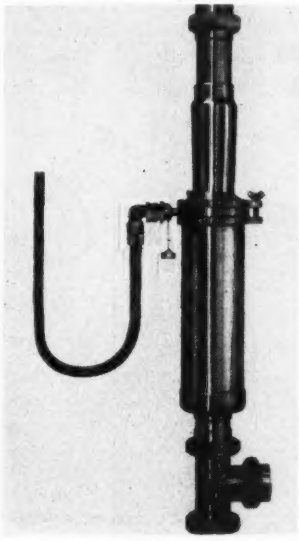
INDUSTRIAL INSULATIONS

...Where Heat or Cold Must be Controlled!



Sanitary Controller Provides Accurate Liquid Flow





Accurate measuring and controlling of the flow rate of liquid food products is reported with the use of this new sanitary dairy Flowrator meter.

All parts in the fluid line (right photo) are made of stainless steel and are equipped with sanitary fittings complying with National Milk Dealer Assn. specifications. Transmission of flow rate readings to remote instruments is accomplished entirely electrically. There are no stuffing boxes, bearings, links, or crevices to permit leakage or contamination.

Variations of viscosity and temperature of milk or other liquid food are stated to make no difference in operation of the meter. Any flow rate from thousands down to a few pounds per minute can be handled.

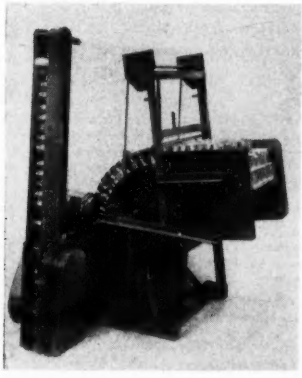
Remote instrument (left photo) used with meter can be arranged for use as either an indicator or as a combined indicator-recorder. Totalizing counters, which show how much milk or other product has passed through meter, can be built into the same instrument case.

Automatic controllers for maintaining the flow rate at a constant value are also available. These may be combined with timing devices to diminish, increase, stop, or start the flow in accordance with predetermined cycles.

Two or more automatic controllers may be coupled together for automatic proportioning of the flow of several liquids in a predetermined ratio to each other.—*Fischer & Porter Co., Hatboro, Pa.*

Circle 109A on Reader Service Card

New Compact Unit for Unpacking and Feeding Cans



This machine will unpack cans at the rate of two bags per minute and deliver them in a single file to the next unit. And small cans can be fed at the rate of approximately 700 per min.

But one man is required to run this new unpacker-feeder.

In emptying a bag of cans, the operator sets the receiving platform at its lowest position, 17 in. from the floor. The bag is then placed on the platform and the edge around the bottom of the bag is cut so that the four sides can be raised away from the package as a unit.

The uppermost tier of cans are swept into the chute by a single movement of the operator. Paper separating the tiers is then removed, and a foot-operated lever raises the platform (by a counter-balance weight) to the level of the next tier of cans. This operation is repeated until the bag is empty.

The cans slide down the chute into a trough, where they proceed by gravity in single file to the elevator, which delivers the cans in a rolling position 56 in. from the floor.

The elevator is run by a V-belt connected to a standard 1,720 rpm., ½-hp. motor. Entire machine occupies only a 40 x 60 in. floor space.—*John Albertoli Co., 418 Beach St., San Francisco 11.*

Circle 109B on Reader Service Card

Junior "P.A." System For Incoming Calls

No longer is it necessary to hold the phone receiver to your ear to hear the incoming voice. For your hands are freed for other tasks when you set the phone piece, receiver end down, into this Addiphone.

The voice is then amplified, public-address style, and it may be heard from any part of the room when the volume is adjusted higher with the turn of a knob on the side of the instrument.

There are a variety of uses for the unit: An executive may call in and speak to several persons at once. Or a stenographer at another desk may thus take down special notes. And employment with important out-of-town calls is feasible.

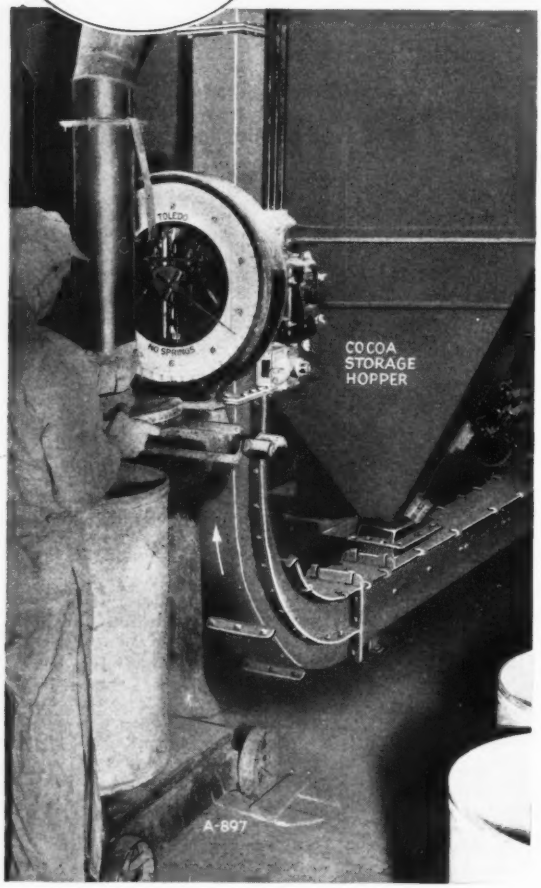
Unit requires no special installation, simply being plugged into the nearest outlet, 110 or 220v. It is not connected electrically with the phone circuit.—*Exim Trading Corp., 11 Broadway, New York City 4.*

Circle 109C on Reader Service Card

S-A CONVEYING *Systems*

for Clean, Dust-free Handling of

FOOD PRODUCTS



A two-unit REDLER conveyor-elevator system handles cocoa from pulverizers to storage bins and from storage direct to a drum loading station without manual effort and without the dust which formerly made the operation disagreeable and hazardous. This totally enclosed REDLER system, at the Robert A. Johnston Company of Milwaukee, Wis., handles 2500 pounds of cocoa per hour.

Handling food ingredients, as well as most other bulk materials, involves many different sets of conditions and often the problems are extremely complex.

S-A engineers have worked out practical, cost-saving solutions to thousands of such bulk materials handling problems over the past 50 years. An endless variety of systems to meet any set of conditions can be designed from the complete line of S-A Conveying equipment. These engineers are particularly well qualified to help you find the right solution to your problems.

The answer may be a sealed, dust-tight REDLER conveyor-elevator system for giving maximum protection to materials or some other type of equipment. Whatever equipment is called for you can be sure that S-A engineers will give an unbiased recommendation based on careful consideration of your specific problem. Write us for full details . . . no obligation, of course.

"Natural Frequency" Vibrating Conveyors	REDLER Conveyor-Elevators
Belt Conveyors	ZIPPER Conveyor-Elevators
Belt Trippers	Belt, Pan & Plate Feeders
Screw Conveyors	Circular Bin Dischargers
Bucket Elevators	Flight & Chain Conveyors
Pan Conveyors	Centrifugal Loaders & Pilers
Vibrating Screens	TELLEVEL Bin Level Controls
Car Pullers & Spotters	Ship Loaders & Unloaders
Hoists & Winches	Crushers, Roll & Ring Type
Bin Gates, All Types	Power Transmission Machinery
	Storage & Reclaiming Systems

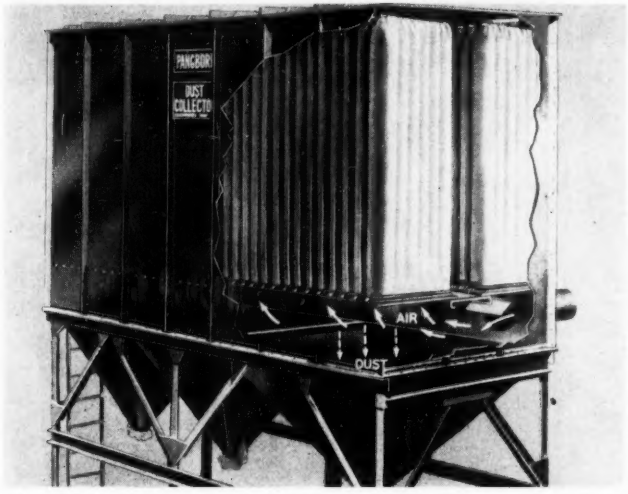
Write for bulletins on any of the above

STEPHEN S-A ADAMSON MFG. CO.

6 Ridgeway Avenue, Aurora, Illinois — Los Angeles, Calif., Belleville, Ontario

DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING

Parts Minimized in Bag Dust-Collector



Simplified design of filter bags and mechanism for reclaiming dust from the cloth-bags marks this new collector. It is reported to provide dust control at low cost in equipment and installation.

Cloth-bag dust collectors range from 5 to 40 ft. long, contain 1,360 to 10,880 sq. ft. of filter cloth, employ from 1 to 6 hoppers, and are supplied with the appropriate structural supports to facilitate the type of disposal desired—wheel-barrow, car, or truck.

Wing-nuts fasten the bags, open end down, to suspension members. Each bag contains a rubber hem at open nozzle end to insure dust-tight fitting to grid plate. By clamping a hand knob, nozzles are sealed over grid openings in floor of collector.

Minimum number of parts and easy accessibility provided by a walkway between bags make it possible to maintain and inspect collector easily and without tools.

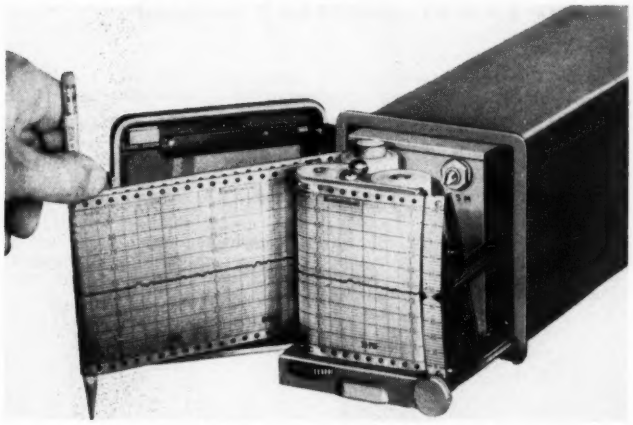
In operation, dust-laden air piped from the plant enters collector at a point just under grid floor. Air loses velocity and heavier particles fall immediately into hoppers. Air then rises through grid into filter bags sealed over each grid opening. All air passes through bags on its way to the air outlet at top of collector.

Dust captured in bags is removed by shutting down exhauster and turning on shaker motor. Shaking and bag suspension members are combined to avoid duplication of parts.

Leaving bags, dust falls through grid openings into hoppers. Then, opening of a valve at bottom of hopper discharges dust from collector for reclamation or disposal.—*Pangborn Corp., Hagerstown, Md.*

Circle 111A on Reader Service Card

Miniature Strip-Recorder Is Fast, Accurate



Announced is a new independently powered midget-size strip-chart recorder with an electronically actuated pen.

Known as the Autronic Recorder, it is an electronic servo-powered null-balance device creating a highly accurate and instantaneous record of the measured variable.

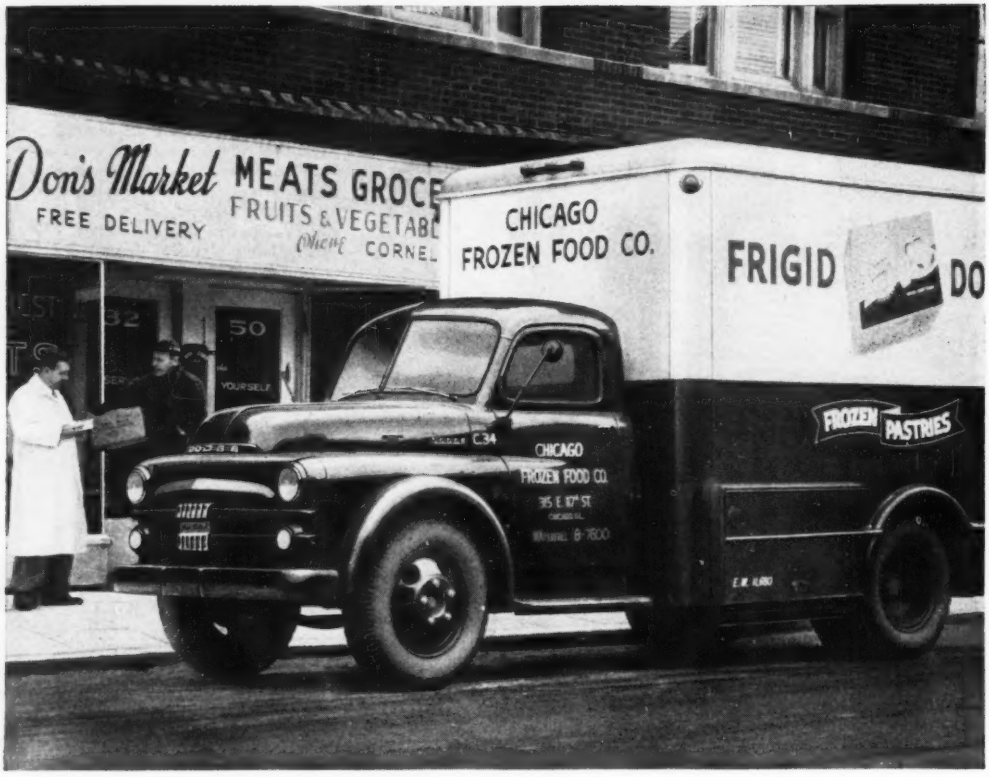
Unbalance between output of primary element transmitter and balancing transformer is amplified to drive the rotary-solenoid motor for positioning the pen. Maximum speed of pen is such that 3-in. chart is traversed in approximately ½ sec.

A three-position response-speed adjuster is included so high frequency fluctuations of measured variable can be dampened out on chart record. Slowing down pen speed, according to maker, does not reduce sensitivity or accuracy of recorder.

Unit employs a simple principle of writing not requiring complex linkages or pantographic mechanisms. Linear trace is obtained by passing chart over right-hand edge of plate, which is formed into a convex arc, the radius of which is equal to that of the 8-in. pen arm. Pen then traces on this narrow edge of chart.

Additional flexibility during operation is afforded because the recording mechanism can be pulled from the case approximately 3 in. (see photo) to allow inspection of past records without stopping recorder.

Recorder face measures 4⅝ x 5 in. (as mounted on control board or graphic panel). It is enclosed in a metal housing that slides into a metal



The low-down on lower delivery costs

The low-down on lower delivery costs is simply this: A truck that *fits the job*, lasts longer, costs less to run. Such a truck will be engineered for low operating and upkeep costs and top performance in *your* business.

There's a Dodge "*Job-Rated*" truck that'll do just that —a truck that's factory-engineered throughout for rock-bottom economy in frozen food hauling. It'll lower your delivery costs right from the start!

You'll get a high-compression engine that s-t-r-e-t-c-h-e-s every gallon of gas over extra miles. You'll get 4-ring pistons that help add months and miles between oil changes. You'll get exhaust valve seat inserts and chrome-plated top piston rings that help keep your Dodge on the road—and out of the repair shop!

And, say, talk about a time-saving truck! Just drive a Dodge and see for yourself what this quick-stepping, sure-braking truck will do in toughest traffic. Add to this the minutes saved at every stop because of extra-low ground-to-floor height that speeds loading and unloading.

Get the complete low-down on lower delivery costs! Find out how you can count on extra savings with a thrifty Dodge "*Job-Rated*" truck. Size one up at your nearby Dodge dealer's—*soon!*

DODGE "Job-Rated" TRUCKS

mounting frame which measures 14½-in. deep.

Three hours of record are visible through glass windowed door, which is held closed by a permanent magnetic type latch.—*Swartwout Co., 18511 Euclid Ave., Cleveland 12.*

Circle 111B on Reader Service Card

Visual Unit Permits Fluid-Flow Check

This new Trin-Vue flow indicator enables inspection of the flow of a fluid in piping systems. Visual examination of fluid in the line is via two windows located on opposite sides of the unit.

Windows are sealed in unit by O-Ring gaskets and Truarc retaining rings. This innovation of sight-glass construction permits a positive seal that is made tighter the greater the pressure or vacuum applied.

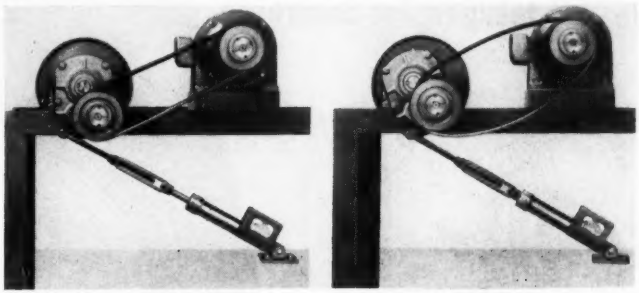
In addition, there are no bolts to be adjusted at the risk of uneven stress on the glass windows. Pressure on glass is equally distributed at all times.

Indicators are fabricated of extra-heavy wall, forged tubing, with Van Stone lap joint stub ends welded into side of body, eliminating excess weight of a casting. Design permits use of stock size tubing as well as of steel flanges.

Unit is available in a range of special materials: Stainless steel, Monel, nickel, and others. Size range is from ½- to 4-in. Pressure ratings range to 50-lb. with Pyrex windows (standard equipment) and are several times higher with windows of Herculite or quartz (obtainable on order).—*The Brooks Rotameter Co., Lansdale, Pa.*

Circle 113A on Reader Service Card

Overload Release Provides Protection for Equipment



Instant and positive protection for driven machines, motors, and the speed reducer itself is stated to be provided by this newly developed overload release.

Called the Tri-Matic, the device is designed to prevent breakdowns, avoid repairs, and insure against interruptions of production resulting from any excessive load on the equipment. It operates both mechanically and electrically to (1) loosen the belts, (2) cut off the current, and (3) activate a warning bell, siren, or light.

Release action is termed instant and positive. Pressure exerted by an excessive load causes a piston to move lengthwise through the unit, this movement loosening the belts and cutting off the current simultaneously. Warning system is hooked to microswitch.

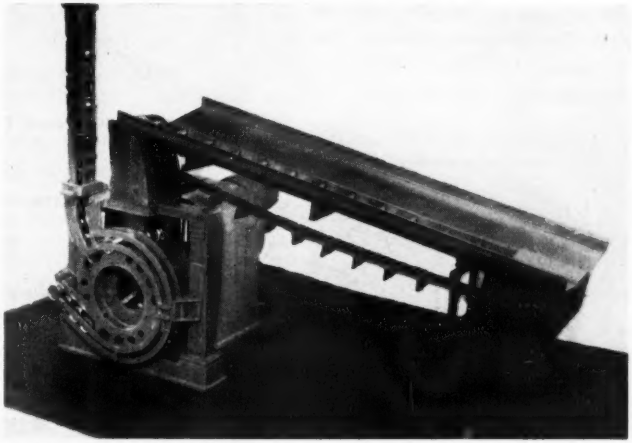
Unit is calibrated for adjustment to load conditions. It can be set to act at any desired load up to the reducer's maximum capacity.

After release has been tripped, resetting calls merely for manually pulling the speed reducer back into position, automatically re-cocking it.

This unit replaces the standard torque-arm regularly furnished, the two being interchangeable.—*Dodge Mfg. Corp., Mishawaka, Ind.*

Circle 113B on Reader Service Card

New Can Filler Minimizes Bean Damage



Crushing and jamming of product when putting whole green beans into cans is stated curbed by this filler.

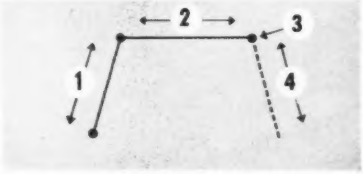
In operation, the unit gathers and gently compresses whole beans to can-sized shape and fills the cans in a single operation. Filling speeds of 25 to 55 cans per min. are reported. Variable speed adjustment allows quick correlation of filling rate with speed of other operations on the line.

Beans spilling from the blancher are

If You're Batch-Cooking You Can Use This Inexpensive Control

Here is a recorder-controller planned especially for economically controlling processes like batch cooking. The Gotham Elapsed Time Recorder-Controller does the essential control jobs easily and accurately. First of all, it brings the batch up to maximum holding temperature fast. It holds the batch at that temperature for a predetermined period. It shuts down the process at the end of the cooking period. Those are its three standard functions. Automatic venting or cooling functions can be added. Also available with a pressure, instead of temperature, system.

Write for full information about the Elapsed Time Recorder-Controller and other Gotham Controllers. They're in Catalog 500.



This Is What the Gotham Elapsed Time Recorder-Controller Does

1. Brings controlled variable (temperature or pressure) up to maximum fast.
2. Holds variable at maximum for predetermined period.
3. Shuts down process.
4. Automatic venting or cooling can be added.

Gotham Elapsed Time Recorder-Controller

SPECIFICATIONS

CHART SIZE: 12"

CASE: Standard - black crinkle; smooth black or white may be obtained.

ACTUATION: Vapor, Gas or Mercury for temperature. Pressure elements available.

CHART DRIVE: Spring wound or synchronous motor.

CONTROL SYSTEM: Pilot relay with adjustable sensitivity for 0 to 30% throttling band is standard, two position or 100% throttling band available.

HOLDING PERIOD: Standard 0 to 3 hrs. Other periods available.

Keep Everything Under Control With Gotham

GOTHAM INSTRUMENTS

Division of AMERICAN MACHINE AND METALS, INC.

Dept. 9, 233 Broadway, New York 12, New York

fed into stainless steel buckets by operators stationed on either side of the conveyor or work table assembly of the filler. Then feeding operators (usually two) smooth beans into buckets, the size of which accommodates the volume of beans required to fill the can to a proper weight.

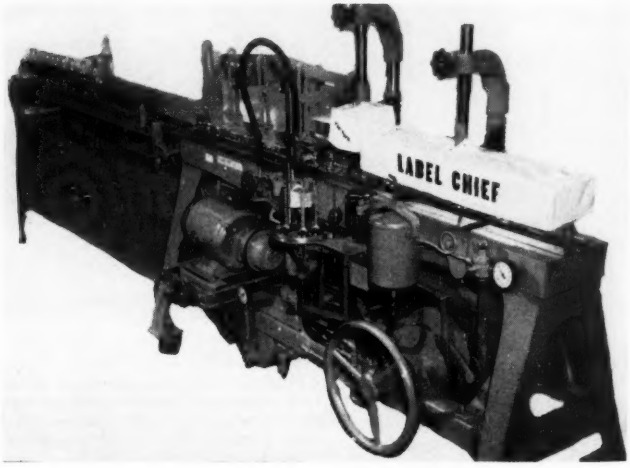
Buckets are then automatically dumped into a stainless steel hopper having a trip arrangement to drop the contents of each bucket into chuck mechanisms. These, in turn, mold the beans into a round mass of slightly less diameter than the can. As cans are positioned for filling, a plunger ejects beans into them.

Work table, buckets and hopper are of stainless steel; chuck mechanisms are chrome plated brass castings, and plunger heads are chrome plated steel. Unit is powered by a ¾ hp., fully enclosed motor which operates at 34-8.5 rpm. on 220/440v.

Machine is 8-ft. 4-in. long, 4-ft. 6-in. wide. Dimensions of the work table are 7 ft. by 2 ft. Weight, crated for shipment, is approximately 2,700 lb. —*Western Filler Co., Box 132, Warrenton, Ore.*

Circle 113C on Reader Service Card

Size Adjusters Added to Labelers



Recent improvement on the "Label" line machines consists of simple adjusting mechanisms to accommodate various sizes of labels and containers. The adjustments, maker states, are accurate and non-fluctuating, so that labels are affixed precisely and identically on each container.

Machine is made in three models: The "Label Chief" (photo), "Label Master," and "Label Champ." Other improvements concern a label table and a re-designed auto-feed unit to permit the labelers to be operated either on a straight line or at almost any angle to the capping line.

The Master is a combination unit which will attach un-gummed or pre-gummed labels to various types of containers. With simple changeover, this machine will also handle heat-activated labels. The Champ is designed for use of heat-activated labels only.

In the first two units, the original principle of spray application of adhesive to un-gummed labels or of water to pre-gummed ones, is still used. Maker states layer of adhesive or moisture on the label is $\frac{1}{10}$ that required in roller method. Reported end result is called quicker and better adhesion to container, further insured by multiple wipe down (each label is automatically wiped onto the container from 5 to 15 times.) Changeovers of label and container sizes are stated quickly made without using extra parts.—*Able Engineering Inc., 607 22nd Ave. N. E., Minneapolis 18.*

Circle 115A on Reader Service Card

Workers' Plastic Lenses Are Tough, Lightweight

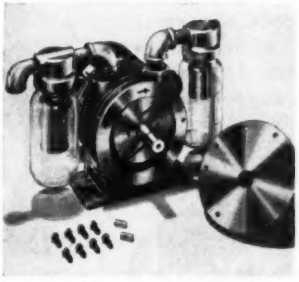
Reported highly resistant to breakage, these new lightweight, plastic lenses are stated to be made according to a special formula and "baked" in glass molds.

Manufacturer cites tests indicating lenses resist splashing chemicals, welding spatter, emery wheel sparks, and impact of hard, small, high velocity particles.

In special trials, lenses are reported to have withstood impact of a 9-oz. steel ball dropped from height of 4 ft.; a 1¼-oz. steel needle dropped from height of more than 4 ft.; and a small projectile traveling at speed of close to 100 fps.—*American Optical Co., Southbridge, Mass.*

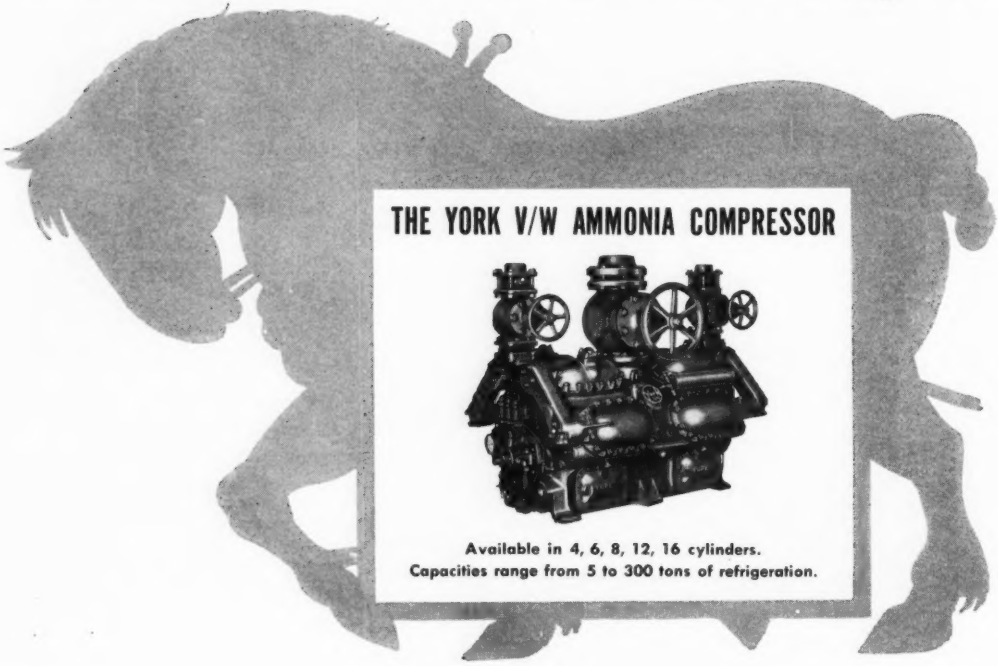
Circle 115B on Reader Service Card

Air Pump Lubricated By Carbon Vanes



No oil is required in the pumping chamber of this new air pump. Instead, four vanes of carbon slide in slots in the rotor to lubricate the unit.

the workhorse of the industry...



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low **operating costs**

• Flexibility and power savings at reduced load capacity. • Reduced starting power requirements. • Pressure lubrication by single pump. • Vibration-free operation—with static and dynamic balance.

low **maintenance costs**

• Increased valve life—pinning prevents wear by rotation. • Minimum friction and refrigerant losses with packless shaft seal. • Can't wear out—all wearable parts quickly renewable. • Longer life with aluminum alloy connecting rods. • Working parts protected from discharge gas.

low **installation costs**

• No special foundations needed for upper floor mountings. • Minimum floor area and headroom for installation.

York refrigeration air-conditioning

The big advances come from YORK

Headquarters for— **Refrigeration and Air Conditioning**

This construction eliminates the necessity of oiling these vacuum or pressure pumps, states maker, and assures delivery of oil-free air.

Neither grease nor oil contacts working parts in pumping chamber, and there is no metal-to-metal contact except at bearings. Ball bearings are grease-sealed for life, and a ventilated space between bearings and pumping chamber prevents grease from entering the latter.

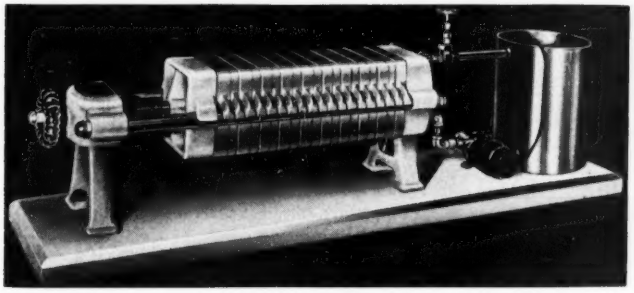
Centrifugal force seats the rotor vanes with constant pressure against the housing, resulting in uniform performance. Vanes are stated to take up their own wear automatically. Since no oil film is used for sealing against loss of vacuum or pressure, pumping characteristics are unaffected by temperature changes. Construction is simplified, since there are no body or end-plate spacer gaskets, no shaft seal, and no lubricator.

Pump is seen applicable in laboratory jobs, on instruments and controls, and on food packaging machinery where oil-free air is essential.

Three models are offered, all producing up to 20 in. vacuum and up to 10 lb. pressure. Model 0740 delivers from 3.5 to 5.6 cfm.; Model 1550 from 8 to 10.5 cfm.; and Model 3040 (photo) from 17 to 24 cfm.—*Gast Manufacturing Corp., Benton Harbor, Mich.*

Circle 115C on Reader Service Card

Laboratory Filter Press Provides Research Data



This small-model press, designed for precise control of filtering operations, has been developed for use in filtering virtually all liquids for laboratory, pilot-plant, or other test applications.

Filtering cycles and rate of filter cake formation may also be determined by this new press.

Constructed of aluminum, with 6 x 6-in. recessed plates, or plates and frames of special noncorrosive aluminum alloy, it is described as exactly proportional to full-scale production models.

Unit has its own specially built slurry tank, is equipped with a single phase motor and pump, and the entire assembly is mounted on a sub-base. Unit is reported capable of continuous performance during peak-demand periods.—*Valley Foundry & Machine Works, 2718 East Ave., Fresno, Cal.*

Circle 117A on Reader Service Card

New Pump Handles Grain Fumigants

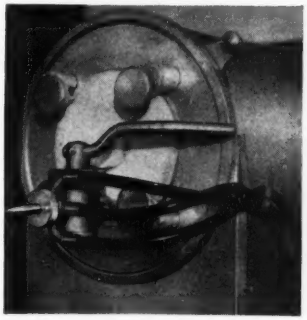
A new efficient fumigant applicator pump has been developed for use in large storage facilities and terminals. It will deliver grain fumigants intermittently as the bin is filled.

Development of a pump for this purpose is important, according to maker, because of the need for a unit resistant to the chlorinated hydrocarbons normally used. In the new machine, packing and all parts are stated to stand up in service indefinitely.

Maker adds that accurate measurement of fumigant delivered is assured, and that installation of machine reduces hazards connected with handpouring of fumigants into bin. Assembly includes explosion proof motor and switches. Pump was developed jointly by The Dow Chemical Co., Midland, Mich., and—*Sherwood Brass Co., Jefferson Ave., Detroit.*

Circle 117B on Reader Service Card

Single Valve Permits Four-Flavor Selection



A new type dispensing valve for continuous ice cream freezing machines has been developed.

Called the Atkins Flavor Valve, it provides an interchangeable selection of four continuous flavors from a single ice cream machine, according to maker. A simple flavor selector switch enables the operator to change flavors instantly.

A large supply of the syrup is contained in pressure pans, located on or near the freezer itself. The syrups are fed to the valve through a plastic hose by a small air compressor.

The valve injects a pencil-thick stream of pure syrup flavor into the center of a basic ice cream. Constructed of stainless steel and dairy metal, the valve is engineered to fit most continuous freezers.—*Midland Co., 1645 Hennepin Ave., Minneapolis.*

Circle 117C on Reader Service Card

Sanitary Aluminum Drum Features High Strength

Extra strength is reported for a new food container made of a strong aluminum alloy.

For additional wearing quality, a ring is attached with continuous weld to keep the bottom of drum off floor. Light weight of drum makes it easy to handle. Solid construction and open bead provide sanitary handling.

Drum is available, with or without handles in two sizes, 30 gal. (18-in. dia., 27-in. depth), and 50 gal. (22¾-in. dia., 28½-in. depth). Two covers, a slip-over or hinge type, and a dolly for easy transportation, are available. —*The Aluminum Cooking Utensil Co., New Kensington, Pa.*

Circle 117D on Reader Service Card

EDITORIAL
FRANK K. LAWLER,
Editor

In Behalf of Progress . . .

Our Birthday Points to Industry Progress

May we point with pride to a milepost of progress which we believe is broadly significant?

One year ago this month we changed the name of your magazine to FOOD ENGINEERING. We dedicated it to the acceleration of the trend toward better engineered food processes, equipment, premises, products, and packages. And we more closely keyed our editorial content to fit the needs of the industry for information of practical value in producing larger quantities of higher quality foods at lower relative cost.

In pointing with pride to this change we are not merely patting ourselves on the back. As we said last April, you and others in the industry are responsible for the change. Those directing the operations of the industry have been applying engineering at an ever-accelerating rate.

So our pride comes from our association with an industry which—long great in size and service—now is becoming great in respect to engineering progress. We are pleased, of course, that we had the good sense to recognize this trend and to take an even more active part in it.

Again at the risk of seeming boastful, we wish to point to a fact which we believe is significant to the industry. Under its new name, our publication is enjoying even greater success. That is true no matter how you measure it. We shall not bore you with the details. Instead, we shall quote a comment from just one reader—a man who combines the functions of plant manager, plant engineer, and food technologist. Said he: "When *Food Industries* became FOOD ENGINEERING, it became more specific and useful."

Naturally, the enhanced appreciation of our publication is important to us. But more than that, it is further evidence of the trend to, and need for, better food engineering. Otherwise, we would have lost acceptance rather than gained it. Either one renders a needed service or he finds himself on an ocean of inattention without a paddle.

So much for what is past. History is important only in that—like a rear-view mirror—it reflects the path of progress.

Looking ahead along this path, we see that it continues in the same direction but broadens out to accomodate heavier, faster traffic. That is, the pace will be quicker. Why? Because high costs and competition demand it. And because the high volume of business and the availability of improved facilities and know-how permit it.

We are continually reporting new methods and equipment. So let us here cite a few typical demands:

A leader in the West Coast frozen food business recently stated that his industry is in dire need of advanced engineering. He said that the process—especially where manual effort is required—is much too high priced and needs new machinery.

Speakers at the National Frozen Foods Convention likewise stressed the need for greater efficiency in the industry, particularly in distribution. And one warehouseman reported that better materials handling paid for itself in a year.

After years of trying, the frozen food industry is beginning to get better low-temperature railway transportation. And this progress reflects itself in the announcement that a prominent meat packer will use mechanically refrigerated cars.

Speaking of meat, a leader in that field a few months ago told fellow packers this: "Improving methods in a broad manner throughout a meat packing operation is tough work, time consuming, and expensive—but it pays off. And we cannot run away from it if we would reach our goal by 1960."

Commenting on the "splendid design for low-cost production" achieved in a new advanced milk plant, an authority told us that 90 percent of all condensing, evaporating, freezing, and canning plants are too complicated."

Pointing out that "the pickle industry is a young giant that has outgrown its clothes," a leading packer recently made this observation: "We must concentrate on our manufacturing methods—first, to improve the quality and, second, to get mass production."

In reply to the comment that high-temperature, short-time aseptic canning is making rapid progress, a technologist familiar with what's coming told us: "You haven't seen anything yet."

We could go on, but "you haven't seen anything yet" summarizes the overall situation beautifully. Advanced engineering seen in the new pace-setting plants and involved in new developments now in the experimental stage all verify the soundness of that summary.

Yes, food engineering is a fast-coming youngster whose close acquaintenance should be cultivated. We are proud to have a magazine dedicated to him and to your needs.

PS—In a paper titled "Engineering in Food Technology" (we call it "food engineering"), an engineer said this about his topic: It "means applying all possible engineering principles to getting more dollars from a ton of beets, a carload of fruit, a truck load of vegetables, or a tank truck of milk." And he specified quality as a "must."

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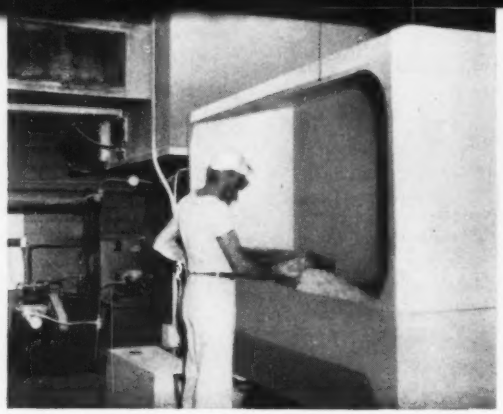
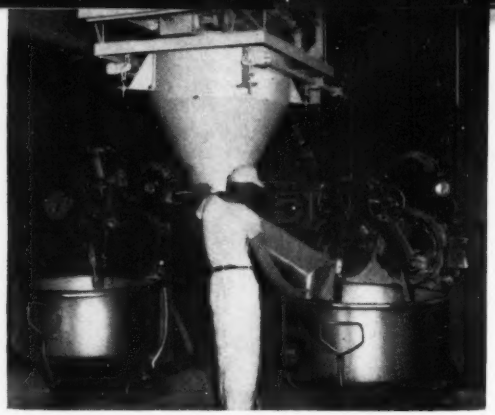
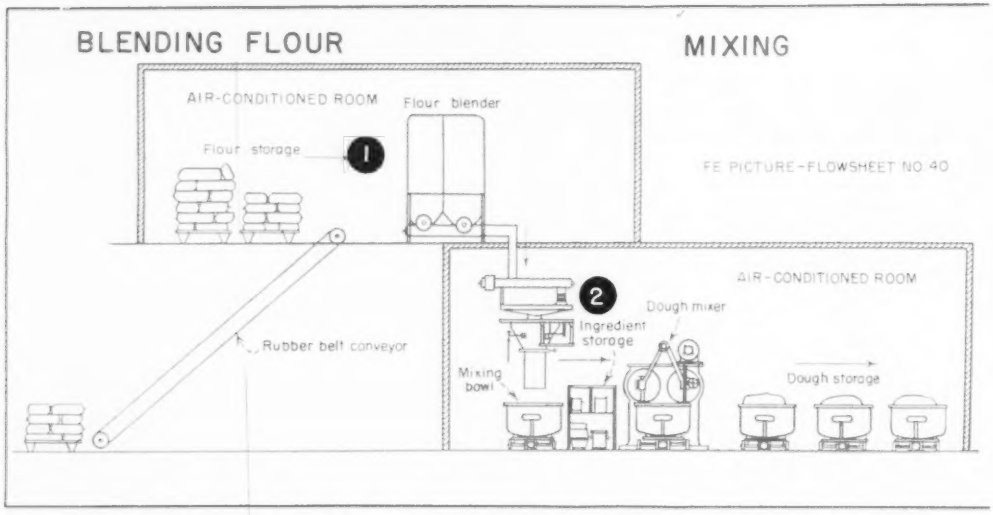
TURN PAGE FOR FOLDOUT FLOWSHEET →



1 **LOTS of flour, stored in an air-conditioned room, are fed into an automatic blending unit.**



2 **FLOUR is sifted and scaled into mixers. Then other ingredients are added and doughs are prepared.**



Producing Top-Quality Pies

Advanced Units and Automatic Devices Assure Uniform Product at High Output

ULTRA-SPEED PRODUCTION of A-1 quality goods marks the pie-manufacturing operations at Wagner Baking Corp., Newark, N. J.

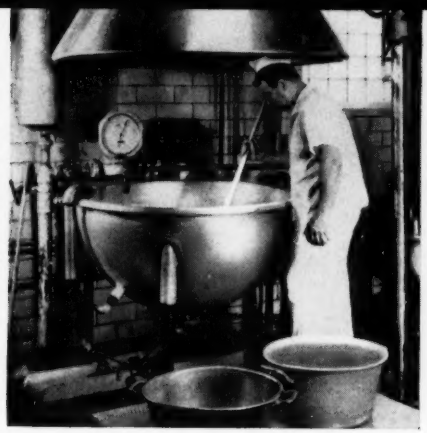
Our accompanying foldout Picture-Flowsheet graphically illustrates the operation. Flour is automatically blended, sifted, and scaled into mixers—Points (1) and (2) in the diagram. Then after other ingredients are introduced, the doughs are made and rest 20-30 min. prior to sheeting.

Meanwhile, fruit fillings are cooked in steam-jacketed kettles and delivered into double-jacketed, hydraulically-operated coolers—Points (3) and (4). Cooled pie fillings now go to the air-conditioned pie-making room.

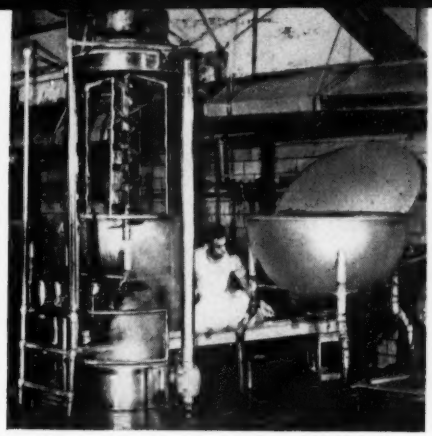
Dough is next fed to the divider, which cuts it into two lumps—one to make top crust, other bottom. Next, pieces of dough go to the pie-making machines that form them into sheets. Bottom sheets of dough are laid over pie tins, which go via conveyor to subsequent stations

Behind This Fast-Moving Production Line

—is the revealing story of Wagner's foresighted adoption of advanced engineering technics and precise quality control measures. It's recounted in detail in this month's special article, "Mechanizes for Greater Efficiency"—on page 65.

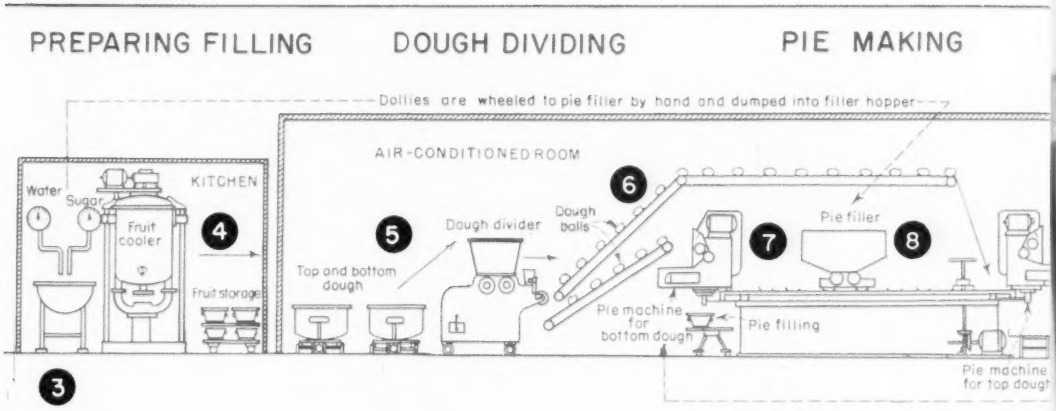


3 FRUIT FILLINGS are prepared in steam-jacketed kettles. Batches are cooked at 200 deg. F.



4 FROM KETTLE, filling is fed into hydraulically-operated cooler. Cooling takes 1 hr.

5 DOUGH go pieces—on



where the dough sheets are automatically packed into the tins. Filling is then introduced, and the top dough sheet is applied. Then a rotary unit trims the excess.

Baking is next. An automatic loading device feeds the pies into a 75-ft. traveling oven. Temperature of the oven is 525 deg. F., and baking takes about 15 min.

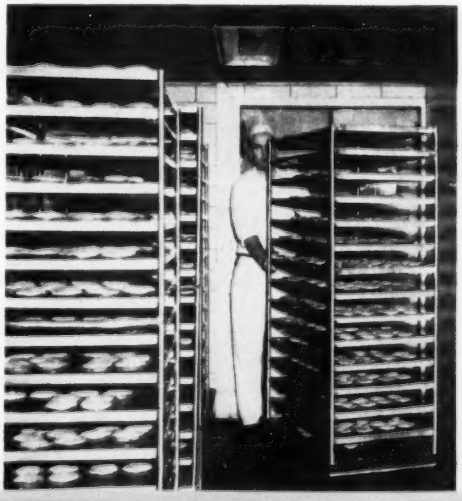
Baked pies are then peeled from the oven and loaded onto sturdy stainless steel racks that are rolled into an air-conditioned cooling room—Point 11. Here, the pies are cooled within 1 hr. as they are held at 60-65 deg. F. and at a 75-85 percent relative humidity.

Emerging from the cooler, the pies are then delivered to the packaging department, where about 75 percent of them are put in bags, remainder in window cartons.

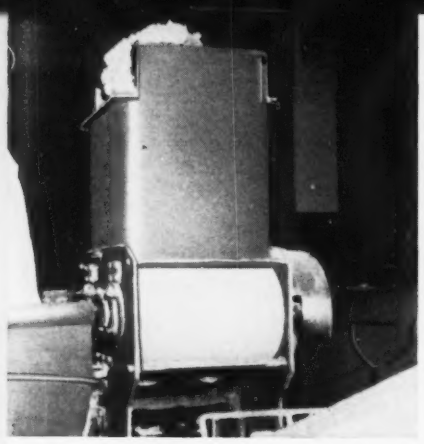
From the packaging lines, pies are conveyed to shipping. The used pie plates are loaded onto triple-decker racks and hauled to a unit that automatically washes, rinses, and dries them, ready for the next bake.

Acknowledgment for the accompanying flowsheet details is made to Don F. Copell, Vice-President, Engineering & Training Div., Wagner Baking Corp., Newark, N. J., who also authored our related special article on page 65.

11 PIES are rapidly cooled on stainless steel racks in air-conditioned room.



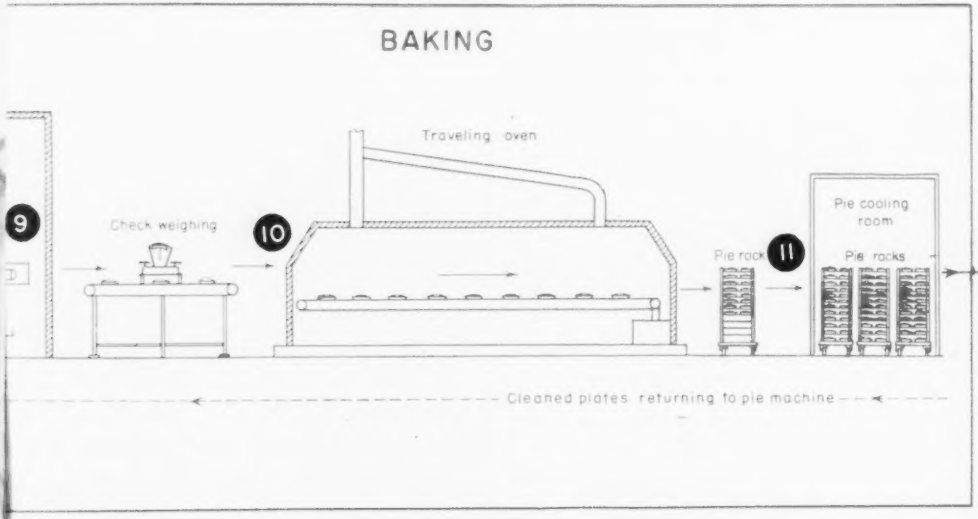
12



es in hopper supplying divider that cuts it into two for top crust, other for bottom.

6 COMING from divider, lumps of dough are conveyed to machines that form them into sheets for pies.

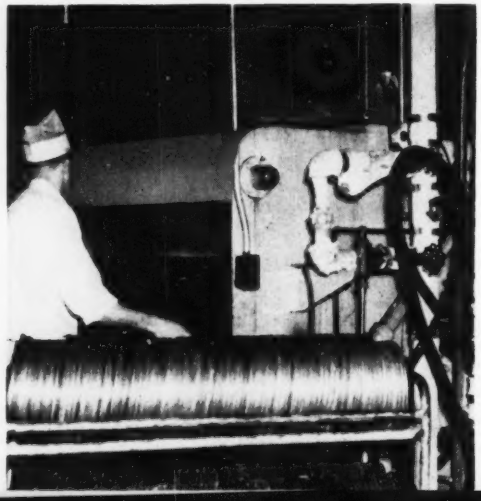
7 SHEET of dough strap of 4-in. pie-t

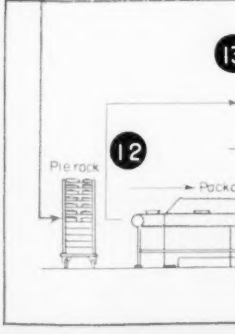


9 TOP SHEET goes rotary trimmer (c

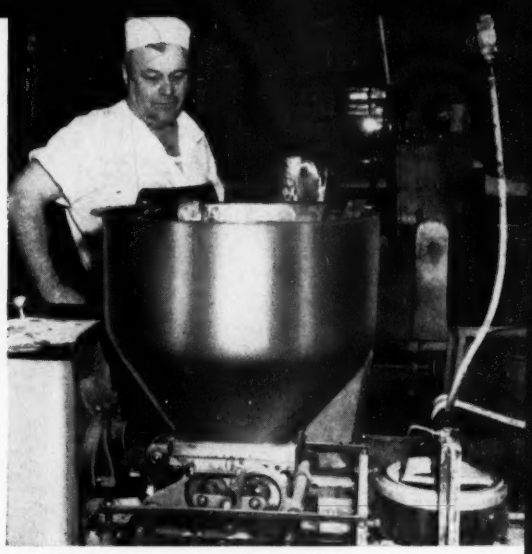
ON PACKAGING LINE, pies are removed from tins, bagged, and then packed into trays.

13 THIS IS UNIT that automatically washes, hot-water rinses, and dries pie plates.

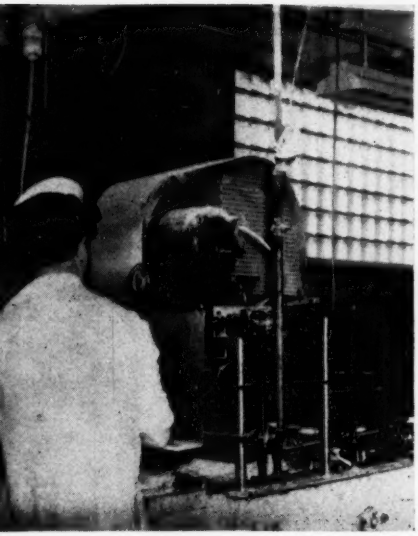




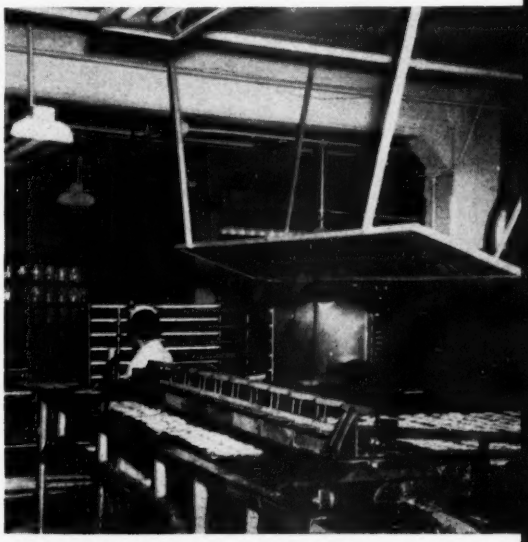
of dough coming from this unit is placed over 4-in. pie-tins. Dough is then packed into tins.



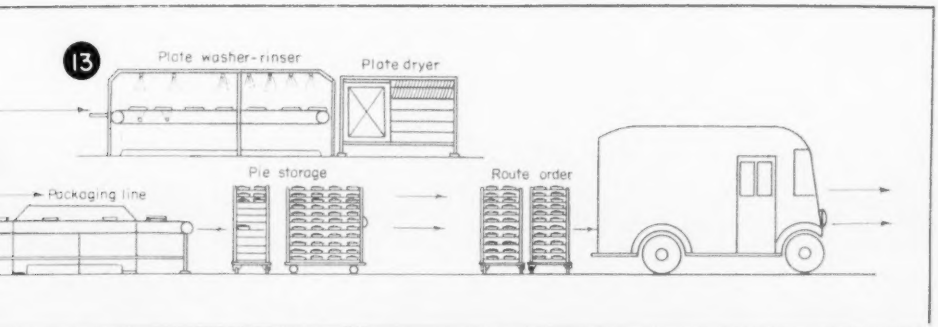
8 **AUTOMATIC** unit puts cooled fruit filling into pies. Brush (lower right) moistens rim of dough.



EET goes on (left). Then pies move to gas-heated, rimmer (center). Oven is next.



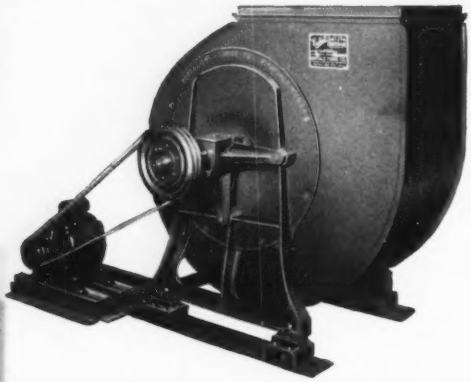
10 **LOADING DEVICE** automatically shoves rows of pies into traveling oven (right). Pies bake at 525 F.



"Buffalo" *Tips on Getting the Best Service from your* **Fans**

MAKING THE RIGHT SELECTION

AXIAL FLOW? or CENTRIFUGAL?



Centrifugal fans like this "Buffalo" Limit-Load model are generally the first choice for large ventilation, exhaust and air conditioning systems. Their efficiency is high even when installation is at a curve in the duct. Medium speed fans, they are ideal for handling large volumes of air quietly at medium pressures. "Buffalo" Limit-Load Fans have the additional advantage of being non-overloading, regardless of the system pressure. For further factors in the selection of a centrifugal fan, write for Bulletin 3737.

"Buffalo" BUILDS BOTH TYPES—

Axial Flows, on the other hand, move air by the propeller principle, straight through the fan housing. These fans will thus be most efficient mounted in straight runs of duct. They are ideal for light-duty ventilation and air conditioning service at pressures to around 2". Axial Flows are higher velocity fans than centrifugals, are lighter weight and more compact than centrifugal fans, therefore lower cost for duct-mounting on ceilings, walls, etc. However, the performance curve is often the last analysis in your choice of fan for each job. "Buffalo" Bulletin 3533-C contains a comparison performance chart of both "Buffalo" Limit-Load Fans and Axial Flows. A copy will be mailed to you on request.

FIRST FOR FANS

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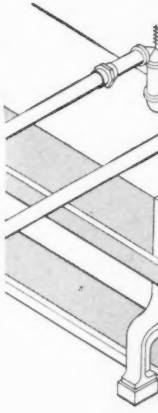

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Do Your Valves Last This Long?

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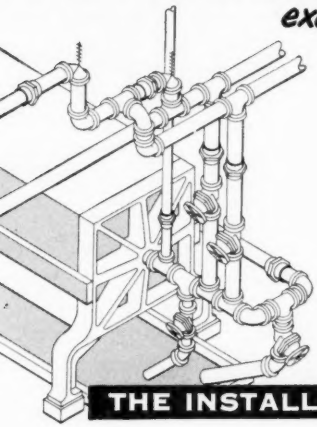

THE INSTALLATION

Packless Diaphragm Valves handling liquid lter presses. Onondaga Pottery Co., Syracuse.

THE HISTORY

cks were used in this service before replacing ane Diaphragm Valves. But the cocks lasted than 2 to 8 weeks. They quickly cut out at and body, damaged by the gritty particles hly erosive effects of liquid clay at 140 psi.

11 months' uninterrupted service, Crane Dia- Valves showed no significant wear or dam- ulting from normal operating conditions. arply reduced maintenance and replacement er plug cocks, and were approved as stand- ipment on filter press piping.

VALVE SERVICE RATINGS

SUITABILITY:	Fluid can't get into working parts
MAINTENANCE COST:	None yet – Big saving indicated
CORROSION-RESISTANCE:	Excellent
SERVICE LIFE:	5 times longer already – no sign of wear
OPERATING RESULTS:	No interruptions – Easier operation – Lower cost
PRICE:	Good
AVAILABILITY:	Stock item – Crane

THE VALVE

In Crane Iron Body Packless Diaphragm Valves, the Neoprene diaphragm acts as bonnet seal only; is not subject to crushing and rapid wear. Separate disc with Neoprene insert shuts off flow even should diaphragm fail. Choice of fully Neoprene lined or unlined valves. Highly recommended for many common and corrosive services; sludges, slurries, etc. See your Crane Catalog or Crane Representative.

plete Crane Line Meets All Valve Needs. That's Why

More Crane Valves Are Used Than Any Other Make!

CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

ES • FITTINGS • PIPE • PLUMBING • HEATING

your control center for sanitation

...walls and floors of Mosaic Tile!

IN TUCSON'S MODERN SHAMROCK DAIRY, bacteriological and product control is conducted in this spic-'n-span quality control room. Sanitary? Naturally . . . the walls and floors are Mosaic Tile!

The durable, tough Mosaic Carlyle Quarry Tile floor resists acids, moisture and dirt. The glazed finish of the Mosaic Tile on the walls improves lighting conditions, provides years of lowest-maintenance service.

Whether you are building or remodeling, find out about the many types of Mosaic Tile before you buy. *They all meet Food & Drug Administration standards of sanitation!* For details, contact our nearest office. For helpful literature, write Dept. 25-8, The Mosaic Tile Company, Zanesville, Ohio.

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THE MOSAIC TILE COMPANY

(Member—Tile Council of America)

Offices, Showrooms and Warehouses across the nation

Over 4000 Tile Contractors to serve you

Sales Offices: Atlanta • Boston • Buffalo • Chicago • Denver Detroit • Little Rock • Los Angeles • Miami • Milwaukee • New Orleans • New York • Philadelphia • Pittsburgh • Portland • St. Louis Salt Lake City • San Francisco • Seattle • Washington, D. C.

Mosaic Tile helps keep sanitation under control in Quality Control Room of the Shamrock Dairy, Tucson, Arizona.

SPECIFICATIONS: Mosaic Glazed Wall Tile, Colors Nos. 143, 162 and white. Floor, Mosaic Carlyle Quarry Tile in Navajo Red. Maloni Tile Company, Tucson, Arizona, Tile Contractor.

Where you will find THE REAL REVOLUTION

"If we keep in mind the values of opportunity, competition, democracy, productivity, then it is our capitalist society which is the truly revolutionary one – the only society which offers true hope to the masses for release from the long nightmares of tyranny. It is we, not the Marxists with their reactionary ideas of the good dictator, who have the truly constructive, the truly revolutionary ideal."

– from "Capitalism" by David McCord Wright.

If we can only win recognition of this truth, we shall win the struggle of free men against communism. This editorial discusses some of the hurdles that must be cleared.

To win the needed recognition that "our capitalistic society... is the truly revolutionary one," we must keep pounding away both abroad and at home. That is because the communists simultaneously attack us on an international front and try to undermine us from within.

The present drive to rearm ourselves and our allies is crucial to our self-protection on the international front. We must be prepared to meet the armed force of aggressive communism with armed force if we are to secure our physical freedom.

Arms are not enough

But to re-establish parity in arms is only half of the battle. In the last analysis it is not the more important half. To be effective, our arms must be backed by loyalty of men to our ideals. So, both abroad and at home, we must win men to the faith that we do have "the truly constructive, the truly revolutionary ideal."

On the international front, the effort to win adherence to such faith in our capitalist society meets tough going. That arises from the fact that in some of the countries that are allied with us in the fight against communism, capitalist society has offered to its people no such ideal. In varying degrees "the values of opportunity, competition, democracy, productivity" – those key aspects of American capitalism – are either absent or subordinated in their economic life. Indeed, the *Wall Street Journal* recently remarked that "to the European, capitalism has become synonymous with cartels – and with the disregard cartels foster for the consumer, the worker and the over-all well-being of the nation's economy."

No Simple Solution

Nonetheless, many European labor and governmental leaders sincerely believe that cartels are essential to their economic salvation. They believe that without such restrictions in congested European markets there would be intolerable cut-throat competition and instability of employment. Thus, when we point out that the cartel capitalism so prevalent in Europe lacks the constructive qualities of competitive American capitalism, we may offend European leaders whose wholehearted cooperation we need in the fight against communism.

But, if we soft-pedal that contrast, we sacrifice the opportunity to win understanding and loyalty from millions of Europeans who have had no chance to learn that capitalism can be the constructive and liberalizing force that it is in the United States. Indeed, when many of these millions embrace socialism it is not because they love it. They are rather desperately seeking a tolerable middle course between what they consider the hateful extremes of communism and the undesirable aspects of capitalism as they understand it.

New name not the answer

We know that there is no easy way to handle the problems created by such misunderstanding of American capitalism. Neither do we share the belief that much of the difficulty would be overcome if we were to call American capitalism by some other name. By doing that, the argument runs, we shall relieve it from the unpleasant connotations that are attached to the word capitalism in some other parts of the world. But, after all, if we are to give up all the terms that have come to mean something else in other parts of the world, we must begin by ditching the term "democracy" which, in the official jargon of the Kremlin, seems to mean what we call dictatorship.

In spite of the difficulties, however, we must stick to this job of exporting the truth that our capitalist system does offer opportunity, competition and democracy. We must let the rest of the world see that it means a continuous drive for increased productivity, and the search for profits by increasing sales and consumption, not by trying to sell less for more.

Export alone not enough

The spreading of truth about American capitalism will not be effective if it is merely directed abroad. Unless it is carried on at home also, it will lack the driving faith that is essential to any convincing export of this type. Nor will export alone come to grips with the communist attack on our country from within—an attack that gets too much help from loyal Americans who short-sightedly repudiate the basic principles of our institutions in their efforts to reform some of their deficiencies. For success both at home and abroad, we must have right here at home a much more militant recognition that it is in fact our capitalist society which offers "the truly constructive, the truly revolutionary ideal."

Here at home, too, this raises difficult complications. Businessmen who are among the leaders and principal practitioners of capitalism, have generally been catalogued as conservatives. Hence, many people must stretch their imaginations a bit to see that businessmen are leaders of a development which has so greatly and so rapidly improved the lot of free men in America that it is truly revolutionary.

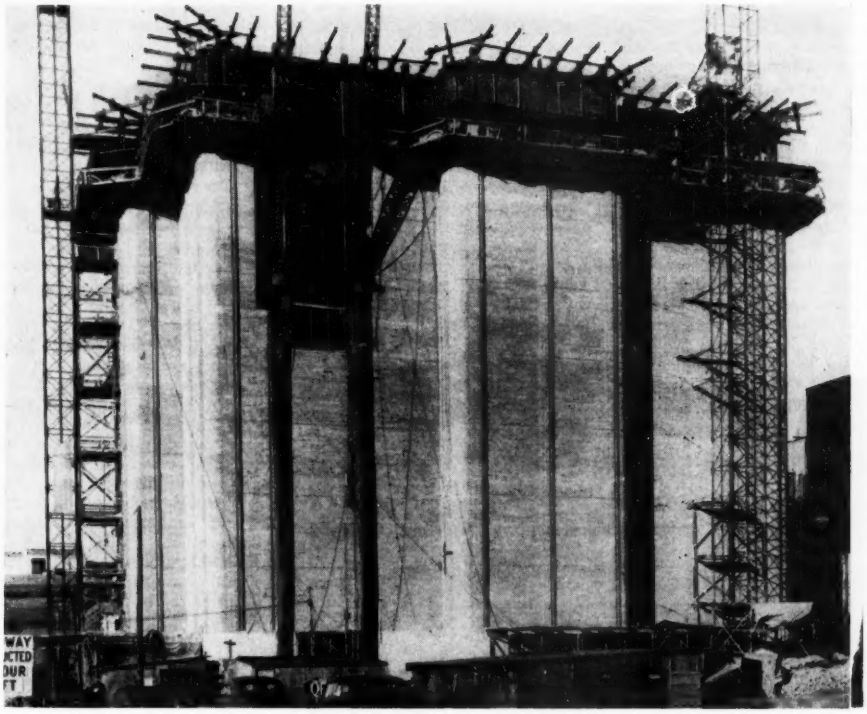
These difficulties of definition, however, are relatively superficial aspects of the problem of seeing our capitalist society clearly. The basic facts are that:

American capitalism is leading free men to an ever higher material standard of living while respecting their spiritual, social and political freedom.

Communism is leading its people back into a life of servile regimentation under dictatorship.

American capitalism advances to high ground never before attained by free men. Communism retreats to ground that men with an appetite for freedom throughout the ages have sought to escape. If we can establish this truth firmly, around the world, we shall no longer need to worry about communism. It will be hopelessly sunk.

McGraw-Hill Publishing Company, Inc.



Structural Work Still Under Way, Yet . . .

. . . already beer was being aged here in Miller's new, imposing Stockhouse "I." Note special technic of prior-walling with insulating blocks (upper floors). Eight of building's twelve stories had been completed when this photo was snapped.

Radical *Reverse* Construction

Saves Many Months and Much Money

Erection of free-standing, insulation-block-walls—preceding exterior masonry work—speeds whole floors of new buildings into active service long before completion of full structure

RUDOLPH H. LANGER
Chief Engineer, Miller Brewing Co., Milwaukee

Necessity–the proverbial "mother of invention"–recently led our company, Miller Brewing of Milwaukee, to the profitable discovery that a lot of time and money can be saved by radical, "other way around" construction.

Confronted with an acute need for additional insulated storage space at the earliest possible date, we reversed the common construction practice by first erecting the insulating walls, and *then* the exterior masonry.

■ **And with only the free-standing insulating walls in place, our cold storage rooms were put into service 9 to 12 months ahead of schedule–resulting in a most notable economy for the company.**

Here is the story:

Our broad expansion of the brewery's facilities to permit production of 3,000,000 bbl. of beer in 1952 called for extensive new construction. The program was based on a five-year schedule during which time the facilities would be enlarged five times their former size.

High Criterion

With plans for our new production extremely exacting, it was imperative that the new buildings "measure up" in every way to avoid future shutdowns for repairs. Our evaluation of building materials going into the new stockhouses was based on years of experience. However, making a deci-

sion on insulation for our structures posed a problem.

The need for special humidity and temperature conditions in brewery buildings places a great emphasis on insulation. Furthermore, experience taught us that we required an insulating material that would not only be non-combustible, vermin-proof, and resistant to moisture penetration, but that also would give us high sanitation and good appearance in its installation and cut overall maintenance costs.

Cellular glass insulation was used successfully in Stockhouse "H".

This building, recently added, is a 10-story structure equipped with 90 stainless steel tanks holding 1,050 bbl., thus giving us well over 90,000 bbl. capacity. Since the cooling system for the building was located in an adjacent structure, we were able to put this stockhouse into operation floor by floor as the building "came up out of the ground"—by enclosing each floor in the sequence of construction.

The masonry walls of Stockhouse "H" are completely lined and insulated by this cellular glass material, with chemical setting plastic asphalt being utilized as the adhering agent. In the machine room, the insulation is protected against damage from traffic and equipment by sheets of 20-gage aluminum over the plastic.

In the balance of the building, the wall insulating material was covered with glazed tile. And on the roof, the insulation was applied with a dip-coat of hot asphalt and finished with several layers of waterproof membrane laid up in hot bitumens, thus giving protection against roof traffic.

Our most recent building, Stockhouse "I", is a twelve-story structure. When completed it will be outstanding among brewery facilities, with a capacity of 260,000 bbl.

This new building presented us with our novel problem: Production demands made it necessary for us to put parts of Stockhouse "I" into service before the masonry work could even be started!

How It Was Done

The solution to the problem was surprising. We needed an enclosed, well insulated building to maintain our low temperatures. We got one by erecting free-standing walls of cellular glass insulation.

As soon as the basement, housing our refrigeration equipment, was completed, we had the insulation blocks going in. Our insulation contractor, was quite certain that the compressive strength of this material (about 140 psi.) would enable us to erect walls 120 ft. in height on the structural steel without laying a single brick. Since the structural floors were completed, we were able to keep one jump ahead of the insulation crew and get the glass-lined storage tanks in place before the exterior wall area was closed in.

The blocks are self-supporting from basement to roof, without additional bracing such as backstays or nailing strips. The wall insulation is tied to the insulated roof, forming a complete envelope. In the course of our expansion program, block walls of this type have "taken" both below-zero and summer weather. Even 65-mph. winds failed to cause trouble. Inside the building we were able to maintain a constant temperature of 28 deg. F., an important consideration in our process.

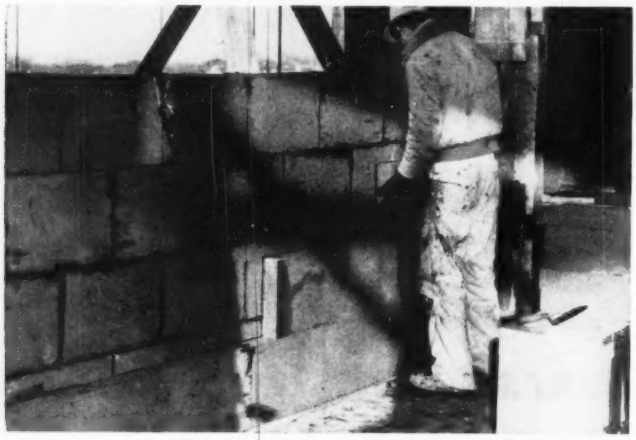
This construction was the complete reversal of our proposed schedule. Our original program called for the insulation to be joined adhesively to the brick walls by an application of a chemical-setting plastic on the masonry wall.

As the brick work followed the three standing walls of insulation blocks up the building, we troweled a 2 ft. ribbon of the plastic around the building above the brick. The masons then embedded the inside course of brick in the plastic to form a strong bond between the masonry and insulation.

The brick work finally caught up to the insulation work on the fourth floor, the latter having been slowed down due to delays in the erection of structural steel. However, when construction was resumed, the insulation crew again went ahead of the masons in the work sequence.

Although we recognized the fact that the construction method adopted

***First*, insulation blocks . . .**



. . . and *then* bricks

on Stockhouse "I" was unconventional, and resulted from an unusual incident, the quality of work was excellent. A conference concerning the unorthodox construction method followed and the facts brought out convinced us that it was actually a more satisfactory procedure than our former system—for these reasons:

1. The block-brick bond proved excellent, since pushing the brick into the freshly applied plastic ribbon provided a permanent, uniform binding.

2. The bricklayers were able to work faster and with more ease, since the insulating blocks set the building lines.

3. As stated previously, the technic speeded construction, permitting us to start brewery operation on floors of the stockhouse at an earlier date.

We then decided to carry on with this new method. And pleased with the performance of the material, we have employed it in our new hop-storage buildings. Here, we continued to use the protective aluminum sheets. Incidentally, this aluminum has served a dual role—for it also acts as a reflective surface repelling heat energy, thus increasing the overall insulation efficiency of the building.

To date, approximately 60 freight-car loads of the insulating blocks have played their advantageous construction role in Miller's broad expansion into new top-efficient, fireproof buildings.

BLS Unveils New Wholesale Price Index

Processed foods are covered by 8 sub-groups and 18 product classes, with fresh items removed to farm list . . . Publication of figures seen speeded

DOUGLAS GREENWALD
McGraw-Hill Department of Economics

A brand new index of wholesale prices of processed foods was recently issued by the U. S. Bureau of Labor Statistics. BLS has been working since the end of World War II to get out a revision of all its wholesale price indexes from foods to metal products.

■ **This is the first major overhauling in two decades.**

The new index begins with data for January, 1947, runs through 1951 (see chart) and will be released regularly from now on. BLS is planning to calculate a processed foods index for the period before 1947 from data of the old index. This series could then be linked with the January, 1947, index number on the new basis to run one continuous series back to 1913.

The current BLS series does not include beverages in the processed foods group. Future issues of FOOD ENGINEERING, however, will publish a wholesale price index of processed foods covering beverages also. BLS will provide the price information.

The processed foods group, as now constituted, was not demarcated in the former index. In the old index, the foods group covered fresh as well as processed fruits and vegetables, fresh eggs, and fluid milk. But in the new index the fresh products are included in the farm products group.

Sub-Groups Specified

The processed foods group is made up of 8 sub-groups: (1) Cereal and bakery products; (2) Meats, poultry and fish; (3) Dairy products and ice cream; (4) Canned, frozen fruits and vegetables; (5) Sugar and confectionery; (6) Packaged beverage materials; (7) Edible fats and oils; and (8) Other processed foods.

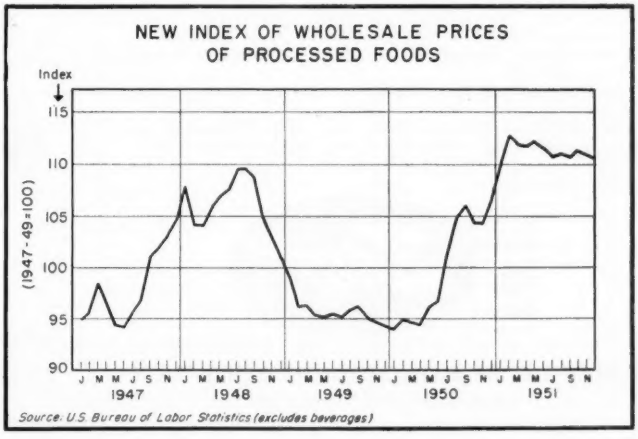
In addition to the sub-group, the new index also covers product classes—i.e., groups of related commodities made by similar processes and having similar price movements. In the processed foods group there are 18 such product classes: Meats; dressed poultry; unprocessed fish; fresh processed fish; frozen fish; canned fish; canned fruits and juices; frozen fruits and juices; canned vegetables and soups; frozen vegetables; animal fats and oils; crude vegetable oils; refined vegetable oils; vegetable oil and products; jams, jellies and preserves; pickles and pickle products; processed eggs; and a miscellaneous class.

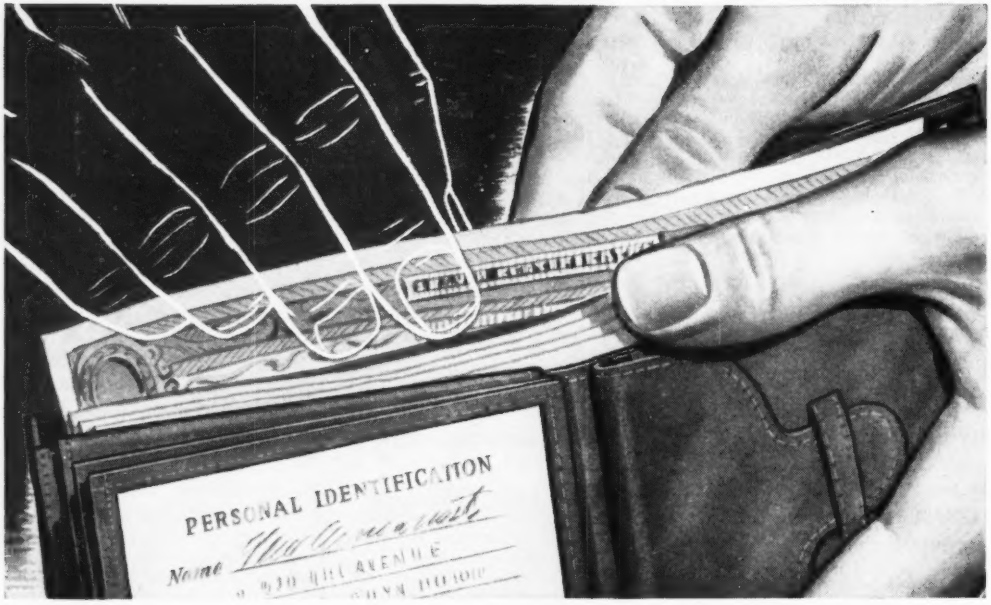
In the revised index, group and sub-group weights are based on 1947 Census data and figures from the Department of Agriculture's *Yearbook of Agriculture, 1947*. But if production or shipment figures of any commodity were distorted in 1947, then relative weights were based on a more typical year. In the former index, the weights were based on average sales in 1929 and 1931.

Processed foods comprise the most important group of the 15 major groups covered by the revised index. Its relative importance in the base period is equal to 15.4 percent of the total value of all commodities in the comprehensive index. But this is a smaller percent of the total than in the old index. In the former index for the year 1950, foods (including fresh fruits and vegetables) accounted for 20.75 percent of the total value of all commodities.

The most important sub-group of the processed foods index is meats, poultry and fish, which accounts for

(*Turn to page* 180)





How much is "FLAVOR FADING" costing you?

Put an end to profit-stealing "flavor fading" in your foods by using wonder-working ZEST

Gradual, hard-to-detect "flavor fading" can be robbing you of untold sales and profits every month of the year. Guard against this invisible sales thief as more and more food processors are doing. Add ZEST, Staley's Monosodium Glutamate, to your foods to "lock in" every bit of the natural, fresh flavor. ZEST magnifies the rich, true flavor of foods as nothing else can! It adds no flavor, no aroma of its own—simply brings out the delicate, natural food flavor *already* present.

As little as 0.05% of ZEST by weight—works flavor magic in vegetables, meats, seafoods, soups, sauces, gravies, chilis and scores of other foods. No formula changes, as easy to use as salt. Just taste *your* foods seasoned with ZEST . . . you'll never be without it! Write today for full details and prices.

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—guards against food "flavor fading"

A. E. STALEY MFG. CO. **Decatur, Illinois**

More ways to improve your products, lower your costs

Use *Sweetose®* Staley's enzyme-converted corn syrup for more natural color, firmer texture, better appearance in canned, frozen fruits, vegetables.

Use *Sta-Sol®* **Lecithin Concentrate** —Staley's highly refined pure vegetable product, for more natural appearance, better oil dispersion, improved moisture retention.

Use Staley Starches—improved thermophile-free Canner's Starches, for spoilage resistant, better bodied canned soups and vegetables.

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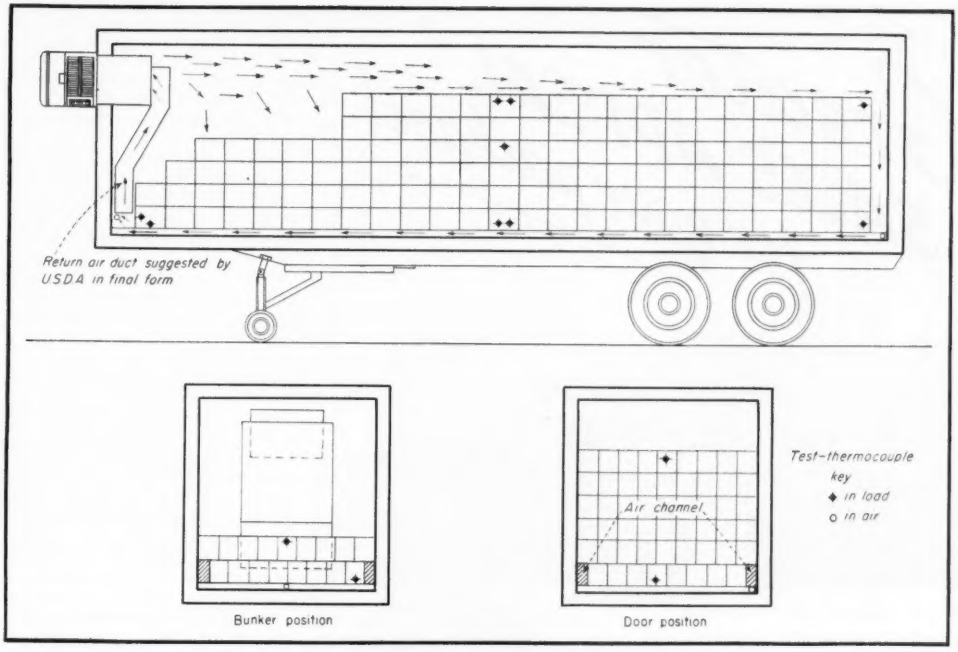
Research Pioneers in Products from CORN and SOY BEANS®



This Scheme of Guided Air-Flow In the Reefer Trailer—

Keeps Frozen Foods *Safely Cold* in Transit

Simple modifications in carriers, plus revised technic in stacking, holds frozen concentrates near zero—more reliably and with greater product-temperature uniformity

IN-TRUCK transit temperatures of frozen citrus concentrates can be kept in the 0-deg.-F range—assuring protection of product quality enroute to market—by providing proper air circulation within refrigerated tractor-trailers.

This conclusion has been reached by the U. S. Department of Agriculture following its survey on trucking of the frozen concentrates between Florida and the north.*

Of the factors examined, adequate and well-directed air movement around the cases of product was found to be the most important in maintaining "safe" temperatures while on the highway.

■ **Method—A few simple additions and modifications in the conventional refrigerated trailer, and adoption of a slightly different technic of case stacking.**

■ **Benefit—Product transit-temperature rises of only 3 deg. F. readily held—compared to an average rise of 9-deg. F. previously.**

Essentially the modifications to provide better trailer air circulation include:

1. Increasing the height of the standard floor deck strips to 1¼ in., while retaining the ⅜ in. deep vertical wall strips normally used.

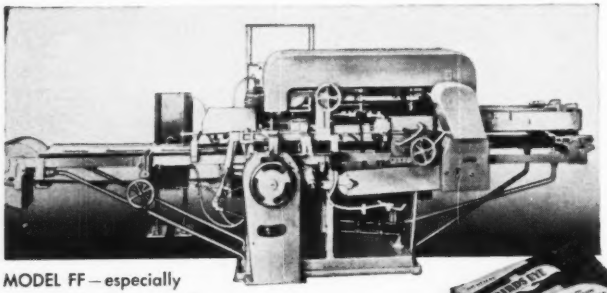
2. Installation of a special compressor-fan suction duct and special trailer baffles to help eliminate bypassing of cold air and to insure return of warmer air from *under* the load.

3. Provision in case-stacking for a 4-in. longitudinal channel at the base of the trailer walls and a 4-in. space between load and back door to aid air movement around the cases.

Before the survey, concentrators using mechanically refrigerated trailers found their product arriving at Northern warehouses at any average

* U. S. Dept. of Agriculture, *Agriculture Information Bulletin No. 62*, price 40¢.; available from The Superintendent of Documents, Washington 25, D. C.

Greater SALES APPEAL for your package!



MODEL FF—especially designed for frozen foods

WOMEN judge quality largely on appearance. That's why a handsome, perfectly wrapped package is so important to sales. All your efforts to sell by means of appealing, colorful printing can be lost if the wrap is imperfect.

Leading packers appreciate this, and it is one reason why so many are installing the Model FF.

This machine was designed especially for frozen foods. The superior manner in which it handles the wrapping material and package assures uniformly accurate registration of the printed matter on end seals as well as top panels . . . Handles trays, cartons or metal-end fibre cans with equal facility. Slight differences in sizes of cartons are automatically taken care of.

The Model FF turns out well over 100 packages per minute. Special type in-feed conveyor prevents spilled produce from being carried into the machine. Advanced type transport mechanism prevents jams, damaged cartons and time lost in making adjustments. Easily adjustable for various sizes.

Get all the facts on the Model FF. Write our nearest office.

PACKAGE MACHINERY COMPANY
SPRINGFIELD, MASSACHUSETTS

NEW YORK CHICAGO BOSTON CLEVELAND ATLANTA DALLAS DENVER
LOS ANGELES SAN FRANCISCO SEATTLE VANCOUVER, WASH. TORONTO MEXICO, D.F.

of close to 10 deg. F., with some cars even recorded at 15 to 20 deg. F. They then asked the USDA, as an impartial agency, to supply technical aid in developing better utilization of standard refrigerated trailer units and railroad bunker cars.

From previous research, the frozen citrus concentrate industry had learned the desirability of maintaining its products at temperatures at or below 0 deg. F. during long storage periods. This was most pertinent, since perfectly good concentrate—at the plant—was found to develop "off-tastes" when delivered to the consumer after being exposed to high temperatures.

Try Many Combinations

Tests were begun in April, 1950, and were completed during the Fall of the same year. The results, however, weren't made available until recently.

A total of 23 tractor-trailer test runs were made—21 with standard mechanically-refrigerator units, and 2 with dry-ice cooling. Different air circulation systems were tried, as well as changes in case stacking patterns—all in an effort to find the technic which would deliver the greatest payload with the least rise in product temperature.

Inadequate channeling of cold air around and under the cases was found to be mainly responsible for the higher product-temperature rises. Tight case stacking caused bypassing of much of the cold air from the compressor fan, and poorly designed baffling was blamed when the fan took "return" air from the top of the load instead of from the trailer floor.

Cases heretofore were loaded on floor racks, made up of strips of wood (running from front to back in the trailer) 1½ in. wide, ¾ in. high, and laid 1¼ in. apart. Air spaces on the sides of the load were provided by vertical wall strips—⅜ in. thick by 2 in. wide, spaced 6 to 7 in. apart. Some units were equipped with corrugated aluminum sheathing to provide vertical channels approximately 1 in. deep between side walls and load.

Solid stacking—nine cases across per tier—was used in practically all commercial shipments up to the time of the tests.

To improve air circulation around the load, the previously listed modifications were tried. Besides installing higher floor strips (1½ in. vs. ¾ in.), only eight cases were placed across the trailer in the bottom row—the usual nine in the layers above. This created a channel approximately 4 in. wide along each side wall, with the channel extending the full length of the trailer.

In addition, a space of 4 in. was left between the rear trailer doors and the back end of the load. (However, caution should be taken not to leave too great a space, since a case may then fall down and block the air passage.)

These changes were found to provide adequate air circulation space entirely around the load. With this method there is a full 1½ in. space under the load, 4 in. at the rear, and two 4 in. tunnels on the body floor at the sides.

The refrigeration unit changes included a vertical return air duct that covered the entire face of the fan intake and extended down to within 6 in. of the trailer floor. In operation, the fan then draws return air from underneath instead of from the top of the load.

Also, horizontal baffles were installed in the bottom-front corners of the trailer to prevent the bypass of air from the top of the load to the return intake.

Four of the last eight trailer tests were made with the refrigeration unit (loading changes as outlined above) with considerable improvement over previous tests. On two of the tests, the average commodity temperatures were reduced: 3 deg. F. from plus 2.5 to minus 0.5 deg. F., and 5.5 deg. F. from plus 2.5 to minus 3 deg. F.

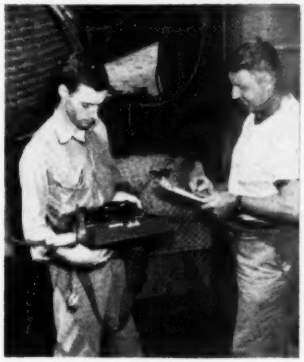
Maximum temperatures of the product after shipment were 3, 6, and 7.5 deg. F,—substantially lower than in any of the conventional trailers.

In the initial tests of mechanically refrigerated trailers using conventional equipment and standard methods of loading, performance was inconsistent. Average temperature rises ran to 9 deg. F., and average product readings were up to 10 deg. F. (some cars at 16 and 18 deg. F.). This led to the modifications.

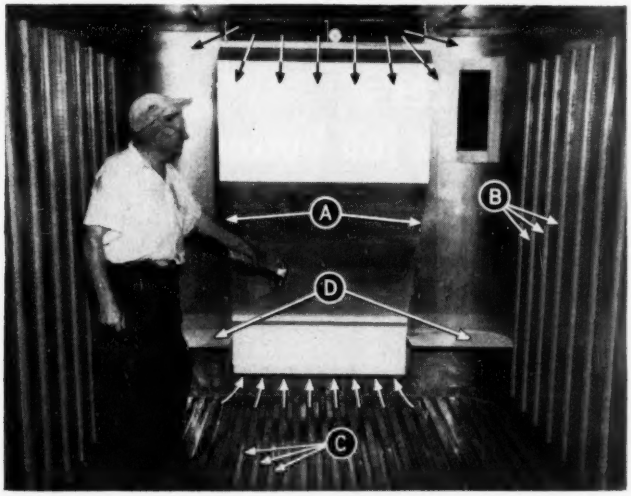
Loading, Unloading Protection

Aside from the lack of adeqnate air circulation around the load, another factor contributing to temperature rises was the lack of protection for frozen concentrate during loading and unloading.

Normally, the units were precooled for several hours and then both rear doors opened for loading—

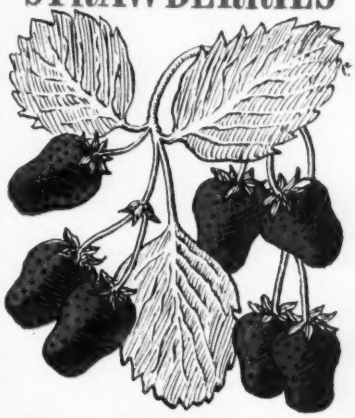


DRIVERS check temperatures in load while on North-bound test run.



RETURN DUCT (A) guiding air to suction side of refrigeration unit is indicated by carpenter. Multiple arrows (above and below) represent discharge and return air. Vertical wall strips are seen at (B), and 1½-in.-high deck strips at (C). Baffles (D) prevent bypassing of cold air.

STRAWBERRIES



The absolute

FLAVOR

in all its freshness

What poet has ever described that sweet earthy taste of fresh strawberries in the Spring? None—but Synfleur flavor captures its very essence! Yes, only Synfleur, after 63 years of experience, is able to produce the oils and flavoring materials that so miraculously re-create the flavors of the fresh natural fruits themselves—strawberries, apples, apricots, cherries, oranges, peaches—to name but a few of the long list.

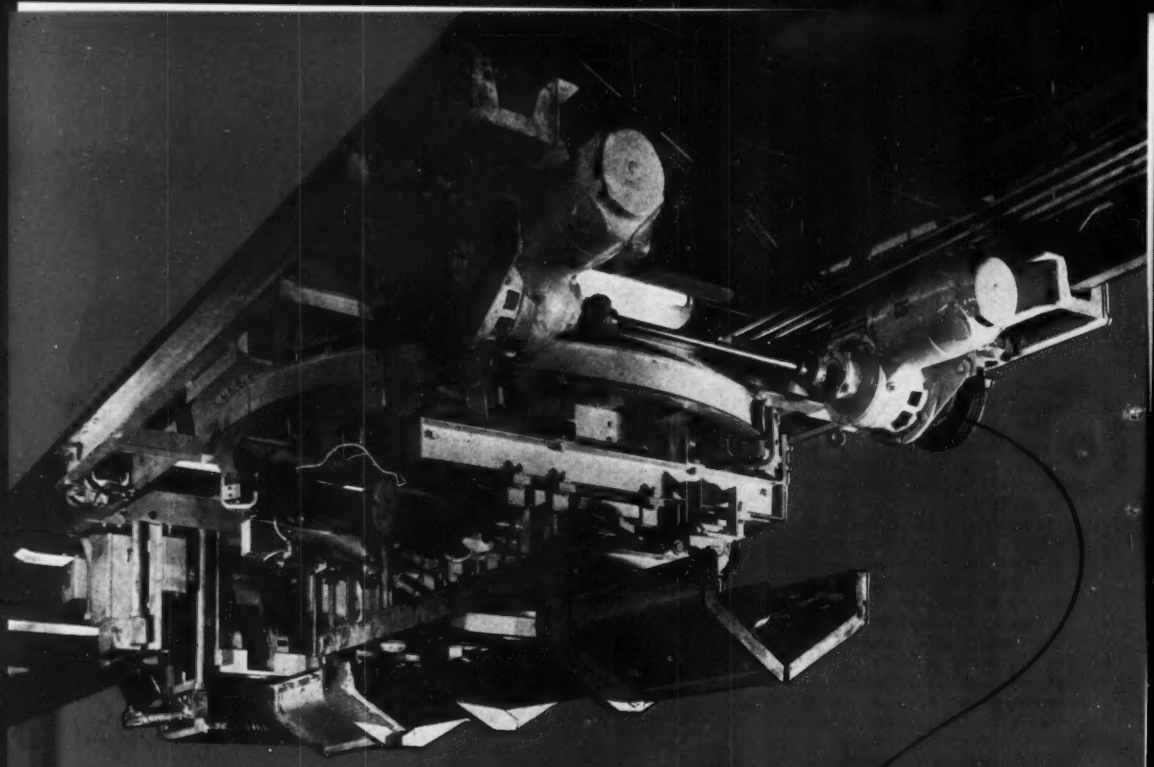
To the manufacturer who desires to add a new item, to modernize an old one or to obtain greater efficiency in production, the cooperation of Synfleur should be of utmost practical value. And, to our experience are added the resources of our completely equipped laboratories—all at the disposal of our customers, to assist you in any way you desire.

Synfleur

SCIENTIFIC LABORATORIES, INC.

MONTICELLO, NEW YORK, U.S.A.

SINCE 1889 TO 1952



You can't beat the combination of the RIGHT horsepower, the RIGHT shaft speed, the RIGHT features all in one compact unit that you can use RIGHT where you want it. It's the best way and the easiest way to select your power drives because you purchase one unit, handle one unit in your receiving, production, and maintenance departments . . . set one unit in place and you're ready to go.

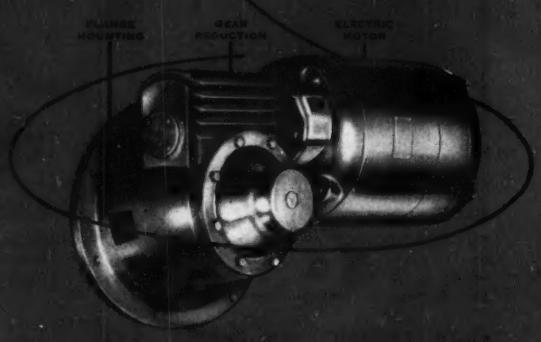
Master Motors, available in thousands and thousands of combinations of types and ratings, permit you to use a power drive that will add greatly to the compactness, appearance, and economy of each of your applications . . . a power drive that makes a good job better.

Use Master Motors to increase the salability of your motor-driven products . . . improve the economy and productivity of your plant equipment. They're the horsesense way to use horsepower.

THE MASTER ELECTRIC COMPANY

DAYTON 1, OHIO

makes a good job better



with no means to retain the refrigerated air. Consequently, air temperature reached upward of 60 deg. F. inside the trailer during the hour required to complete the operation.

Recommendations to avoid these temperature rises include a free-hanging canvas curtain over the rear end of the trailer or a canvas tunnel between storage room and trailer end, at both origin and destination points.

The following mechanical failures were also found to be important in causing temperatures to rise: Leaks, leading to loss of refrigerant; thermostat failures; engine and also compressor troubles; and sticking of reverse cycle valves.

A thorough inspection of the unit before the start of each long trip is indicated. Also suggested is more careful training of the drivers in detecting trouble.

Brought out, too, was the factor of time differences in runs between the *same* points—that is, between loading at origin and unloading at destination. The variations were found due to week-end layovers at intermediate or destination terminals while waiting for Monday unloading. Recommended: "Tighter" scheduling.

Schrafft's Advanced Handling

—*Continued from page 95*

foreign matter—the heavier stones, clay, and metals, and the lighter sticks, straw, and dirt. Cleaned beans pass over a powerful magnet that also removes stray metal.

A horizontal flight conveyor now carries the beans through an enclosed concrete tunnel to the main processing plant, where an inclined flight conveyor and a bucket elevator lift 5,000 lb. of cocoa beans an hour to the 7th floor.

Here, the beans are discharged into a short horizontal spiral-type conveyor that feeds three 16,000-lb. hoppers. Each metal hopper has a pyramid bottom and is divided into three sections for holding different varieties of beans. By opening slide valves on these hoppers, beans are gravity fed to three company-designed roasters, each measuring 2½ ft. dia. by 45 ft. long.

Vertical Roasters

Unique feature about the Schrafft roasters is that the beans are processed in them while moving on to the next operation—a dual processing and materials-handling system. Fully 1,000 lb. of beans are handled per roaster per hour.

While the column of beans moves downward, a blast of hot air from gas-fired indirect heaters passes in and out through the column and discharges at top of roaster with ducts leading to the outside.

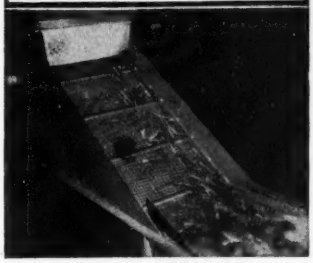
Roasted beans drop onto a 6-ft.-

What's Coming Up in FOOD ENGINEERING

Slated for early issues of FE are practical articles a-plenty—every one aimed to aid you in doing a better job of making quality foods at low cost, with the accent on the "how." To name just a few—

Report on "Chemical Additives" Used To Improve Processed Foods
How Instrumentation Boosts Quality, Cuts Costs in Meat Industry
Advanced Engineering in Large, Modern Biscuit Bakery
Quality Control and Efficiency in Small Freezing Plant
Automatic Proportioning of Ingredients in Making Ice Cream
Improved Technics Speed Cereal Plant Operations
Lift Trucks Multiply Capacity and Save Plant Expansion Costs
How Champagne of Price-Winning Quality is Made
Dairy Builds Broad Markets by Creative Processing
Two-Way Radio Speeds Maintenance and Reduces Down-Time
Manufacture of Liquid Sugar Reflects Engineering Progress
How a Leading Beverage Bottler Controls Quality
New Chocolate Plant Designed for High Productivity
Switches Delivery Dollars Into Greater Net Profits

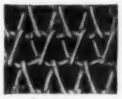
Put the
FREEZE
On Freezing Costs
with a
CAMBRIDGE
WOVEN WIRE
CONVEYOR BELT



Whether you're freezing vegetables, meats or fruit products . . . in bulk or I. Q. F. . . . there's a Cambridge woven wire conveyor belt to help you cut freezing costs by combining movement with processing all along your production line.

For example, this photo shows a specially designed Cambridge belt carrying asparagus spears from a wash tank prior to freezing. Other belts may be used on inspection tables, in blanchers, on packaging and labeling machines, in freezer tunnels.

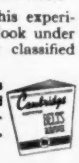
The moving belt eliminates manual handling, helps maintain product uniformity. All-metal construction gives longer belt life and lower maintenance costs. Open mesh of the belt provides free drainage of wash waters as well as free circulation of air in the freezing tunnel. Special side or surface attachments are available to meet individual requirements.



Cambridge Balanced Weave

Cambridge belts can be woven to any mesh or weave, from any metal or alloy, including stainless steel. Next time you have a conveyor belt problem, call in your Cambridge field engineer for his experienced advice. Write direct or look under "Belting-Mechanical" in your classified telephone directory.

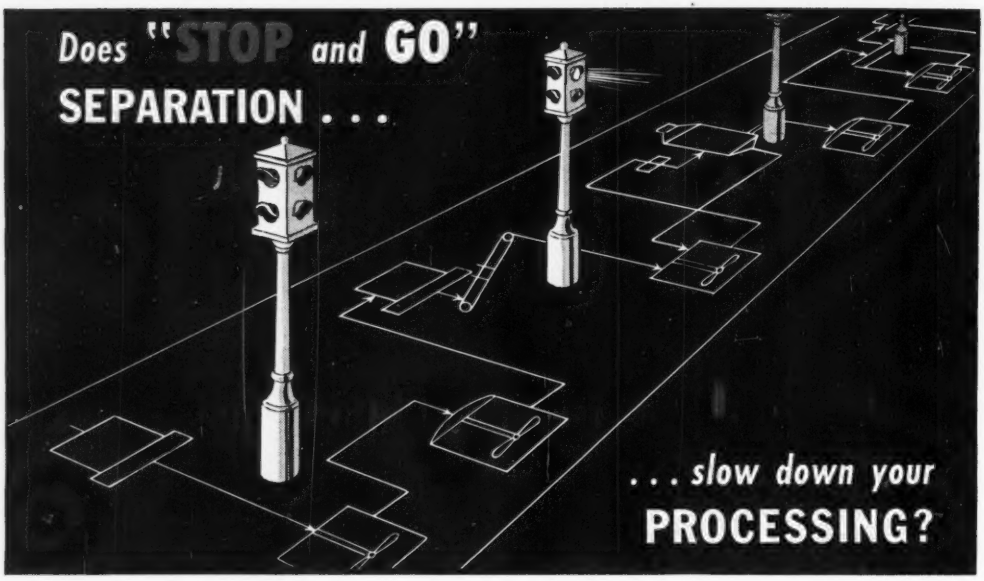
FREE BELT MANUAL Includes information on conveyor and conveyor belt design, metallurgical data and belt maintenance. Write for your copy today.



The Cambridge Wire Cloth Co.
Dept. Q • Cambridge 4, Md.

WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

OFFICES IN PRINCIPAL INDUSTRIAL CITIES



Why Buy DE LAVAL?

For 70 years, De Laval has never compromised with quality. De Laval machines are built to apply centrifugal force to the solution of a problem *in the most efficient manner*. Many De Laval machines remain in useful service after 20, 25 or even more years.

De Laval quality pays—both in long life and in better separation.

The flow of a chemical or food process must be continuous if it is to be profitable. De Laval centrifugal machines speed up a process by removing the bottlenecks that inferior methods of separation or clarification can cause. These machines take lost motion out of (1) liquid-liquid (2) liquid-solid or liquid-solid-and-liquid separations by making each ***continuous*** by means of centrifugal force.

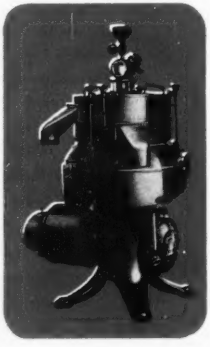
Sometimes De Laval centrifuges will reduce a separation process that once took minutes to a few seconds. Moreover, in making a separation continuously, these machines frequently make a ***cleaner*** separation than could be effected by stop-and-go methods.

De Laval centrifugals come in many different types and sizes to enable each application for centrifugal force to be met exactly. In writing for information, outline your general problem to De Laval engineers.

THE DE LAVAL SEPARATOR COMPANY
Poughkeepsie, New York 427 Randolph St., Chicago 6
DE LAVAL PACIFIC CO., 61 Beale St., San Francisco 5
THE DE LAVAL COMPANY, Limited, Peterborough, Ont.

DE LAVAL

MAKES SEPARATION AND CLARIFICATION CONTINUOUS PARTS OF FOOD PROCESSING



long wire-mesh cooling belt on the 4th floor mezzanine. A bucket elevator then raises the beans to the 6th floor, where a horizontal spiral conveyor feeds them to the crackers and fanners. From floor-level bins, roasted nibs are gravity fed to triple mills (grinders with horizontal stones).

Special Mobile Hopper

As needed, chocolate liquor is gravity-fed from storage tanks into a 3,000-lb.-capacity scale hopper mounted on an overhead monorail—a company designed handling unit. This mobile hopper is pushed to floor-level outlets, through which the liquor is chuted down into processing equipment on the floor below.

Chocolate liquor is then gravity fed into two batch mixers that have horizontal agitators. Into these mixers, melted cocoa liquor is metered and pulverized sugar is batch-weighed. A Fairbanks photo-electric batch-control scale is employed for batch-scaling the sugar.

Installation of two specially designed, flexible, swivel-type conveyor belts solved the difficult problem of feeding chocolate mix from mixers into a second set of processing tanks on the floor below. Each swivel belt is suspended from a circular overhead monorail to enable an operator to feed chocolate into six processing tanks—twelve all told with the two belts.

A chain wheel drive is employed with each belt so that the chocolate can be fed directly into a processing tank. The receiving end of each belt is below the floor-level outlet feeding chocolate from the batch mixer.

Tilt-Type Feed Buckets

Depending upon the kind of coating to be made, the chocolate is either pumped into refiners on the floor above, or it is emptied into two 2,000-lb.-capacity buckets—comprising another efficient, flexible chocolate-handling system. Installed to feed the chocolate into other refiners, these buckets are of tilting-type and are suspended from a circuit overhead monorail. A yoke secures each bucket to the monorail. Tilting is accomplished by a manually operated worm-gear assembly.

From the refiners, chocolate is again fed into the same tilting buckets. It is either pumped into these buckets from one refiner system, or gravity-fed from the other group of refiners through flexible metal pipes. Buckets are then manually tilted to discharge the chocolate into conches.

Next, the chocolate is emptied from the conches into flexible metal pipes suspended from the ceiling on the floor below. These pipes feed the chocolate into a second set of monorail-mounted tilting buckets—one of the firm's original product-handling installations. From these buckets, the chocolate is discharged into 13 rectangular, hot water-jacketed storage tanks, equipped with horizontal agitators. Capacity of each of the latter tanks is 15,000 lb.

Continuous circulation of chocolate coatings to enrobers and back to storage tanks is another of Schrafft's noteworthy materials-handling innovations put into operation when this plant was first built. Refined chocolate is pumped under 275-375 psi. from storage tanks into six pipelines feeding 400-lb.-capacity water-jacketed, tempering-type, enrober-supply kettles that are equipped with vertical agitators.

Chocolate is gravity fed into a battery of enrobing machines on the floor below. Meanwhile, chocolate is circulated from supply kettles to storage tanks. Pipes are not insulated, since the temperature in the rooms is high enough to keep the chocolate in a fluid state.

Also provided are convenient take-off outlets for feeding chocolate coatings to various locations in the hand-dipping department.

End (*Resume reading on page 95*)

Quality Syrup

—*Continued from page 98*

low the compounding and syrup-mixing area. Since the two syrup-mixing tanks are set in the floor—with tops almost at floor level—their lower portions, with draw-off piping and reverse sanitizing connections, thus are made available just behind two banks of scale-type fillers.

Finished syrup—drawn from the mixing tank through a 4-in. header—first passes through a multiple-filter before fanning out to a line of six filling spouts. Filler location is uniquely combined with a semi-automatic weighing system. Empty stainless steel drums are rolled into place, spout connected, and, at the same time, occupy a position on a scale base. Above each drum an associated Kron scale dial registers its tare weight.

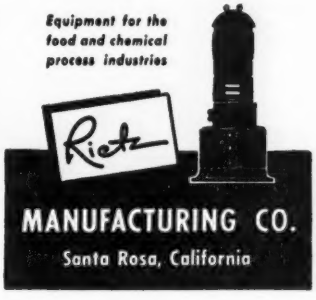
To fill a drum, the attendant merely flicks the stop-cock on the spout to open. When the scale dial setting—corrected for drum tare—reaches 53 gal. the flow is automatically cut off. Then the attendant trims the fill to an exact 55 gal.

Three men, operating one bank of fillers, are able to package a 5,000-gal. batch—close to 100 drums—in less

Rietz Disintegrators
For fine or coarse grinding, pulverizing, pulping. 360° screen in wide variety of sizes. Patented differential discharge.

Rietz Prebreakers
for preliminary size reduction operations requiring crushing and breaking of tough materials. *Rietz* BLOCKBUSTERS are used for frozen meat blocks.

Rietz Thermascrews
TL COOKERS: continuous screw-conveyor steam blanchers. TJ HEAT EXCHANGERS for heating or cooling; batch or continuous.



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BATTERIES

ARE YOUR BEST POWER BUY— AT ANY PRICE

They ASSURE high maneuverability of trucks . . . rapid, accurate handling of material. PROVIDE uniform rate of material handling with no unscheduled down time. SHOW lowest costs of operation, maintenance, repair, depreciation . . . inherently safe. Call in an Exide representative, and let him prove these facts.

THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 2

Exide Batteries of Canada, Limited, Toronto

"Exide-Ironclad" *Reg. Trade-mark U. S. Pat. Off.*

than an hour. And, while a duplicate bank of fillers serving the other syrup mixing tank operates in sequence, the "down time" of the first system is used to clean and sanitize all connecting piping. Similarly, the syrup mixing vessel is thoroughly cleaned after discharge.

After filling, drums are sealed and rolled into the shipping room for labeling. This area is capable of holding 1,200 drums prior to shipping, which is primarily by truck, directly from the company's loading platform to bottling plants.

Drum Maintenance

All drums for shipping Dr. Pepper syrup are identical 55-gal. stainless steel units, equipped with two rubber tires to expedite rolling and handling. At present the company has 10,000 of these, all manufactured by the Rheem Mfg. Co. and Niles Products.

Drum maintenance and cleaning is a rigid routine. Incoming drums, which are returned by truck from bottling plants, are first washed on the outside with hot water and the old label removed. Next, five are placed on a rack and 190 deg. F. water is sprayed inside to clean and sterilize them. An inside visual inspection, with the aid of a small light beam, follows. If the drum passes inspection it is then routed directly to the filling room.

Any dented drums are sent to a special machine for reshaping. Here, the drum is filled with water and placed under 80 lb. internal air pressure. By tapping at any dented point with a rubber hammer the smooth contour is once more restored.

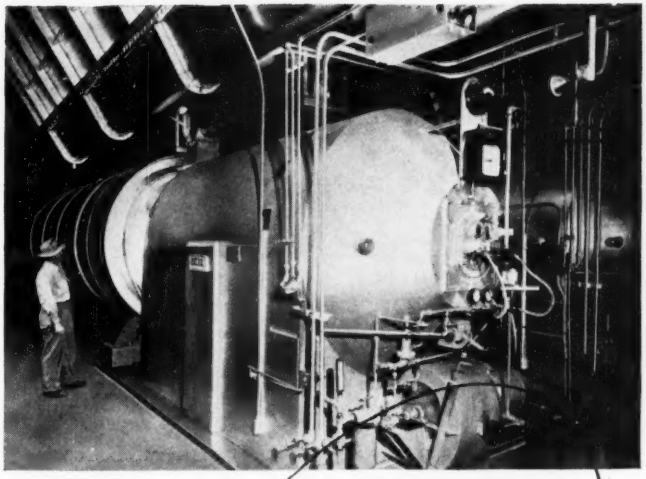
End *(Resume reading on page 99)*

Sweet Corn Test

—Continued from page 88

time. Determination of kernel size is of course extremely simple and rapid. Although it is also a very simple procedure, the pericap determination does require a 2-hr. drying period, which delays the determination of quality by a longer time than may be practical in actual plant operations. It may be possible to reduce the time of this test by using larger screens, and perhaps heating the oven to somewhat higher than 100 deg. C. (Limited work with the tenderometer indicated that this instrument could not replace the pericarp test.)

In actual plant operation, it may also be found expedient to determine the pericarp content and kernel size at regular intervals, such as once daily, or once for every field or variety of sweet corn that is received. In such



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Step up quality of output

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With Cyclo-Matic Drying, it costs less to get highest quality output—relatively cool, due to rapid moisture evaporation, short retention time in drum. Perishable vitamins and nutrients are preserved—only moisture is removed. Outlet temperature and moisture content are thermostatically controlled. No boiler is required — heat exchanger losses are eliminated.

Ardrier Dehydrators save you money on original cost — on installation, operating, and maintenance costs, also. Capacities, 2,000 — 12,000 lbs. of water evaporated per hour.

Find out more about how Ardrier's exclusive 3-pass drum and showering flight design can lower your per-ton drying costs. Send coupon for bulletin.

Ardrier Dehydrators are manufactured by The Heil Co.

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Send me Ardrier Dehydrator bulletins.

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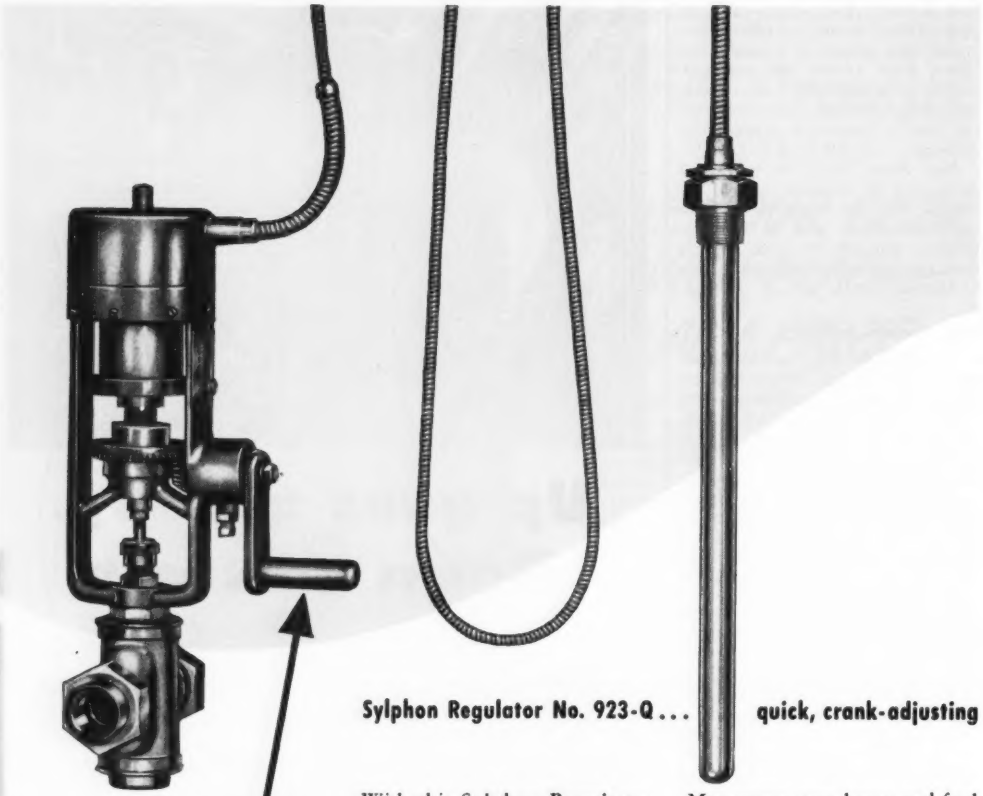

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MAKES TEMPERATURE TO ORDER ...FAST!

With this Sylphon Regulator, you can make quick changes in process temperatures—control operations faster and better. A simple turn of the crank adjusts the temperature to the setting desired. It's much easier and more accurate than conventional hand-wheel type regulators, especially for batch processing.

You get *more* advantages with this Sylphon Regulator. Because it provides dependable, accurate temperature control, you are assured of uniform processing conditions. Wasteful overheating is prevented. Spoilage is reduced. Manpower, man hours and fuel are saved.

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cases, it may be convenient to use charts similar to those presented in Fig. 3, when the Steinlite method is used, and Fig. 4 when the succulometer is used.

Thus, if it is established in advance that the material arriving at the plant during a given period of time averages, say, close to 6 in. in dia. and the pericap content averages close to 1.5 percent, only the heavy line in the chart (top right, Fig. 3) need be used to determine the U. S. grade for each individual load as determined by its individual Steinlite moisture value.

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The article above comprises Scientific Paper No. A347, Contribution No. 232 of the Maryland Agricultural Experiment Station, Department of Horticulture; partial support from Regional Research & Marketing Acc't. Funds (Project NEM-3).

End (Resume reading on page 89)

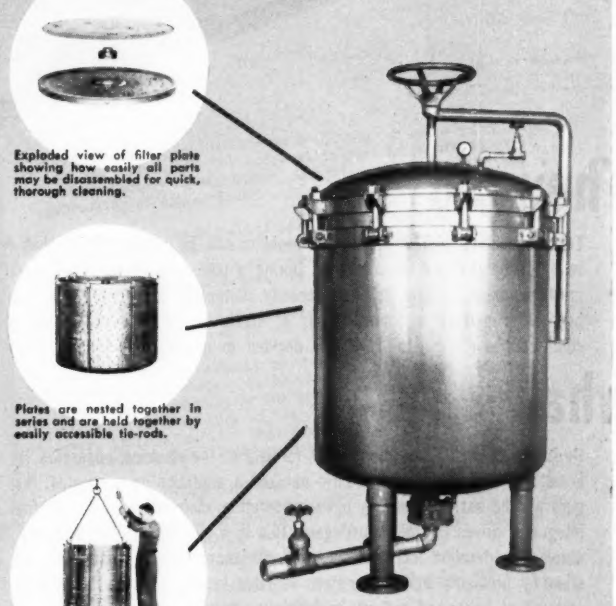
"Damage Claims"

—*Continued from page 100*

have learned that inside-carton dimensions should be exactly the same as the sum dimensions of the cans along the particular side of the carton. And the height of the carton should be ¼ in. less than the cans.

When a snug fit is thus provided, the top rims of the cans bite into the corrugated carton top when mechanically sealed, and a more substantial package is thus obtained.

....in food processing
Sparkler Filters
share your responsibility



Exploded view of filter plate showing how easily all parts may be disassembled for quick, thorough cleaning.

Plates are nested together in series and are held together by easily accessible tie-rods.

When cleaning is indicated the entire assembly can be removed from the filter tank to the most convenient cleaning station with minimum effort and labor.

When processing any type of food product, there are certain standards of purity and sanitation that must be met both in the public interest and in the interests of maintaining the manufacturer's reputation.

Sparkler filters *are* designed to help do that job . . . simply and positively.

The illustrations show why Sparkler filters are completely sanitary. They also show how the horizontal plate is used. It is this horizontal plate feature that assures unsurpassed quality and *constant* quality of filtrate. With a Sparkler filter on the job, the entire filtration process becomes one step in your operation that *you can count on.*

Write Mr. Eric Anderson for full information.

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MUNDELEIN, ILLINOIS

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Herengracht 568, Amsterdam, Holland

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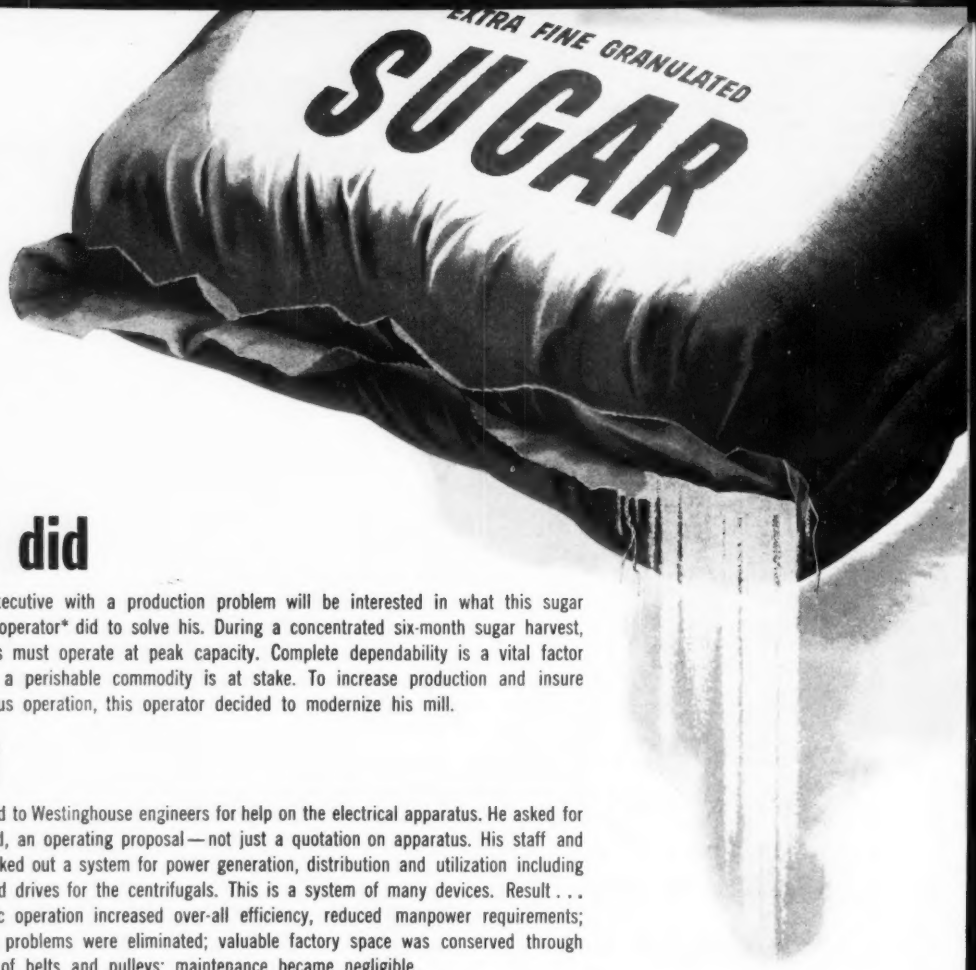
Manufacturers of fine filtration equipment for more than a quarter of a century.



They did

Every executive with a production problem will be interested in what this sugar refinery operator* did to solve his. During a concentrated six-month sugar harvest, machines must operate at peak capacity. Complete dependability is a vital factor because a perishable commodity is at stake. To increase production and insure continuous operation, this operator decided to modernize his mill.

what

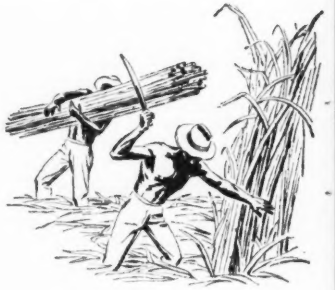
He turned to Westinghouse engineers for help on the electrical apparatus. He asked for a method, an operating proposal—not just a quotation on apparatus. His staff and ours worked out a system for power generation, distribution and utilization including integrated drives for the centrifugals. This is a system of many devices. Result . . . automatic operation increased over-all efficiency, reduced manpower requirements; stand-by problems were eliminated; valuable factory space was conserved through removal of belts and pulleys; maintenance became negligible.

you can do

You can profit by this operator's experience. It proves that capacity problems are solved with capacity thinking. We want to do that kind of thinking with you and your engineers.

to produce more

The actual devices can be selected later. It's how you put them together that counts—whether elevators, stokers, turbines, motors or transformers. Many manufacturers make good electrical apparatus. Westinghouse, in fact, makes a broader line than anyone else. But the priceless ingredient Westinghouse offers you, in addition, is the skill of broadly experienced engineers in putting together the right combination of good apparatus to let you produce more with what you have. Westinghouse Electric Corporation, Pittsburgh, Pa.



*name on request

YOU CAN BE **SURE**...IF IT'S

Westinghouse

Food brokers, along with shippers and rail carriers, know the expense, waste, and inconvenience caused when a consignment of freight arrives at a warehouse in damaged condition.

Our improved methods, responsible for considerable savings in time and money, are also bringing in unsolicited letters from brokers. Like these–

Wilkes-Barre, Pa.: ". . . We note that this is another of the damage-free cars–which we like very much due to the fact that our damaged merchandise is reduced to an absolute minimum."

Wichita, Kan.: ". . . This car arrived here Sunday and the Kansas City portion was unloaded. And we are pleased to advise that there was no damage whatsoever in the car. One of the dividers (deckboards) had been broken, but no damage was caused."

Milwaukee, Wis.: ". . . For your information, this is the second such car that has been handled. And as yet there has been no claim for damage on merchandise shipped this way."

St. Louis, Mo.: ". . . The three shipments of canned fish arrived in St. Louis almost simultaneously. Car (number given, conventional box car) arrived with six cases of damaged merchandise. Car (number, conventional) arrived with fourteen cases of damaged goods. Car (number, new-type car) arrived in perfect shape, without the semblance of a damaged carton."

Wilkes-Barre, Pa.: ". . . The car was rescaled after the Scranton consignment was unloaded. The car is a far cry from the ordinary box car and in this instance certainly accomplished its purpose of delivering the entire load of 3,120 cases safely to its destination. Increased use of this kind of equipment reduces not only the railroad damage claims but saves everyone along the line a lot of valuable time in handling and settling these claims."

Cairo, Ill.: ". . . Our portion of this damage-free car consisted of 750 cases checked okay without damage, shortage, or overage."

Savings In Dunnage

It is difficult to estimate the amount of money we have saved in the elimination of ordinary dunnage–wood, nails, etc.–and in the manhours needed to install and dismantle it. But the figure is substantial. I should estimate that we are saving from $15 to $20 per car in dunnage alone. It was our experience that little if any of that material was salvageable.

By far the most important saving is the virtual elimination of damage claims.

End (Resume reading on page 101)

Here's what
IN-PLANT CHLORINATION can do

"Member of National Canners Association"

BAKER CANNING COMPANY

Packers of Number 10 Tins
Wisconsin Quality
. . Peas . .
Whole Kernel Corn

Address all Communications to Theresa, Wisconsin

Theresa, Wisconsin
April 4, 1949

Wallace & Tiernan Co., Inc.
Newark 1, New Jersey

Gentlemen:

We have been using In-Plant Chlorination for a few years, and feel that this piece of equipment is just as important in a canning factory as any other piece of equipment used in the processing of canned foods.

The first year we installed In-Plant Chlorination we had chemists make bacteria counts, and checks at approximately fourteen points throughout the plant, such as picking table belts, flume systems, washers, blanchers, fillers, closing machines etc. In making these tests we did not use In-Plant Chlorination for one week, and the next week we used In-Plant Chlorination in order to make comparisons as to bacteria count.

The reduction in bacteria count, between the two operations is almost unbelieveable. We found that by using this equipment properly, and increasing the dosage at clean-up time, we eliminated bacteria at many of the check points. One cannot, however, install In-Plant Chlorination and forget about a good housekeeping job. This would be an error, indeed.

However, by having In-Plant Chlorination, and doing a good job of house-cleaning, one can eliminate the building up of bacteria in most any piece of equipment. We do find that by using In-Plant Chlorination the clean-up time necessary at clean-up periods is practically cut in half.

You may use this letter in part or in full - for any purpose you care to.

Yours very truly,

BAKER CANNING COMPANY

By

RDB:eal

In-Plant Chlorination, engineered by Wallace & Tiernan, can help your plant, too. Bacterial counts are reduced, odors controlled, and on-the-line time for processing equipment increased when you use this proven method.

Call your nearest W & T Representative now for complete information.

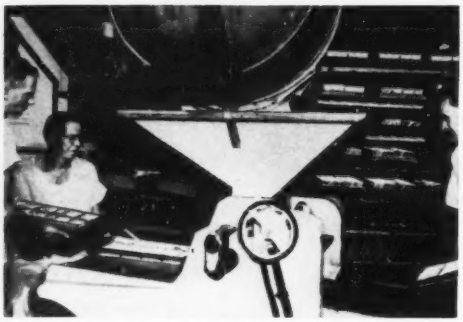
Other services by Wallace & Tiernan Associated Companies include Merchen Feeders for precision blending BY WEIGHT; Richmond Sifters for all separating problems involving powdered or ground materials; and Richmond Permaflux Magnets for the complete elimination of any ferro-metallic contamination of your food line.

WALLACE & TIERNAN
COMPANY, INC.
CHLORINE AND CHEMICAL CONTROL EQUIPMENT
NEWARK 1, NEW JERSEY • REPRESENTED IN PRINCIPAL CITIES

1-33

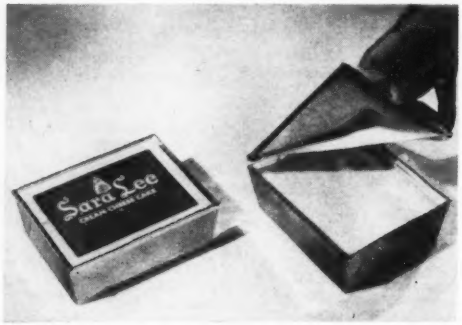
For more information, use post card on last page.

NEW PACKAGES & PRODUCTS



CAKE DOUGH is automatically filled into 31-oz. aluminum pans. These containers are placed on heavy tin trays with wooden guard rail around edge to prevent slipping off.

PAN-FILLED trays are placed in revolving band oven and baked at 350 deg. F. Container eliminates pan greasing, transfer and washing operations, and baking time of cake.



CHEESECAKES are packaged in pint-size foil pans. Originally distributed and sold under refrigeration, these cakes are now frozen, making possible shipments to a broader market.

POUND CAKES in 31-oz. foil pans present an appetizing and sparkling appearance. Packages keep cake moist and fresh. Cakes were formerly baked in large pans, cut in loaf-shaped pieces, then individually wrapped.

Baked Goods in One-Trip Aluminum Foil Pan Packages

A semi-rigid, one-piece container of heavy aluminum foil to hold baked goods from the time they go into the oven until carried home by the customer has been developed by Reynolds Metals Co., Louisville, Ky.

This container eliminates need for preliminary greasing. The cakes are said to bake more evenly and in less time. Also, cakes cool rapidly, and since they are sold right in the container, no time or labor is spent transferring them to a separate take-home unit.

From the display angle, the containers are particularly effective. Bright and shiny-immaculate, they give a deluxe appearance to the product.

Kitchens of Sara Lee (New York and Chicago) is one of the companies now using this type container for its cheesecake and pound cake.

Because of the soft, rich texture of the cheesecake, the company found it could not easily transfer the product from baking to display containers. The latter must be distributed, displayed, and sold under refrigeration. Also, ingredients were costly, and hence a container in which a small cake could be conveniently marketed at a price that would attract volume sales was sought. The pint-size aluminum pan was the answer.

Originally, the cake was sold only in New York and Chicago, because of its restricted keeping qualities. But the company has now developed a method of successfully freezing these cheesecakes, making possible shipments from the New York kitchens to the entire eastern region, and from the Chicago kitchens to the entire Midwest.

With the successful marketing of the cheesecake, Sara Lee is now launching a rich, home-style pound cake in a 31-oz. container, the same as used for the cheesecake, except that the sides are higher.

The containers can be used without lids, and the cakes frosted on top only—saving material as well as labor.

Lids are applied to the containers with a semi-automatic closing machine. Label design for the cheesecake is color-printed right on the aluminum. Paper labels are at present being applied on the pound cakes.

In the home, after the product is used, the lid is put back on and serves to keep the unused portion fresh. The pan also makes an attractive serving dish on the table.

For More Data on Package Supplies Named Use Reader Service Card

A blank cap merely seals

A cap with a message seals and SELLS

Every time your package is opened or closed, the cap can repeat your brand name, slogan, or sales message. A colorful Armstrong-designed cap does more than provide a safe, sure seal for your product. It also acts as an effective sales aid—catches customers' eyes, increases sales.

Consumers prefer Armstrong's caps because they're so easy to use. A simple twist—the cap comes off! Another twist—it's on again! The seal is tight and sanitary—flavor and quality are safely locked in. This is another reason why Armstrong's lithographed caps help you to maintain buying preference—keep customers sold on your product.

If you aren't already sealing your package with a sales-winning Armstrong lithographed cap, better contact your Armstrong representative. Ask him for complete information—or write direct to Armstrong Cork Company, Glass and Closure Division, 8504 Prince Street, Lancaster, Pennsylvania.

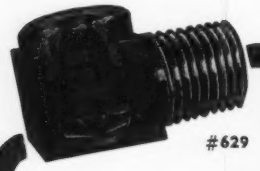
Western Representative: I. F. Schnier Co., Inc.
San Francisco 7 and Los Angeles 12

An Armstrong Cap

Armstrong's Metal Caps

Packaging Headquarters for Armstrong's Glass Containers, Embossed-Top Corks, Crowns, Artmold Plastic Caps, and Du Pont "Cel-O-Seal" Bands

THERE'S A MONARCH NOZZLE FOR EVERY SPRAY JOB



#629

In many Food Processing plants Monarch Spray Nozzles are used to . . . .

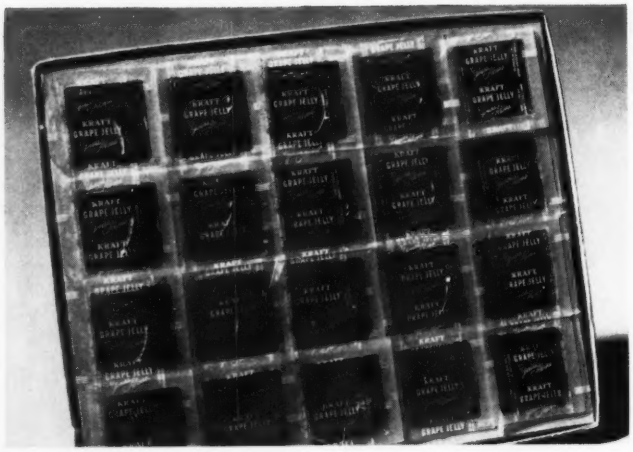
Wax Fruits
Rinse Vegetables
Powder Milk
Dry Eggs
Wash Filter Cake
Humidify
Banana Rooms

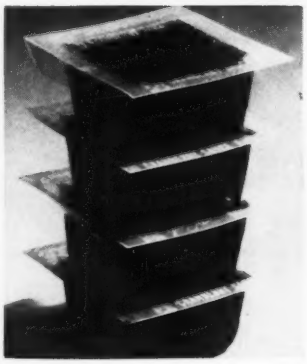
Remember

if the liquid can be sprayed with direct pressure Monarch can furnish the Nozzles.

Send for Catalogs 6 A and 6 C

MONARCH MFG. WKS., INC.
2517 E. Ontario Street
Philadelphia 34, Pa.





Many Features Cited in Individual Food Portions

A revolutionary new development in institutional food service has been announced by Kraft Foods Co., Chicago. This is the packaging of jellies, jams, and cranberry sauce, under the label "Kraft–Yours Alone", in individual plastic servings.

The company expects to increase the line to other foods, from appetizers to desserts. Though development thus far has been in the institutional field, the company feels this packaging technic might well find acceptance in the consumer field.

The jellies and jams are packaged in ¾-oz. sizes, while the cranberry sauce comes in a 1-oz. size. The items are packed 20 to a container and delivered in quantities of 10 containers to the carton.

Called the "Portion Control" package, it is formed of a special solid, semi-opaque, Vinylite plastic–entirely inert material specially compounded to be compatible with all food products. Designed for one-time use only, it is easily disposable. There are no limitations in the sizes and shapes that can be produced in a completely automatic operation.

The sealed closure has an over-flap extending over the edge of the package, permitting easy removal by the user. This closure can be lightly or tightly sealed, depending on the perishability of the food.

Advantages of the new package are reflected in the reduction of kitchen labor costs in filling individual containers, no waste of product in filling, positive inventory control, keeping quality, and sanitary features of the sealed package.

Kraft has an arrangement with the Bakelite Div., Union Carbide & Carbon Corp., New York City, for production of the Vinylite used in producing the new package, having acquired use in the food field of packaging facilities and methods developed by Foodies, Inc., on which patent applications have been pending.

For Package Data Use Reader Service

Handy Banana Pack

A compact, attractively designed, and easy to handle container for banana shipments is now being successfully used by F. Di Bella & Sons, Boston.

Printed in realistic banana yellow, a life-size "hand" of the fruit is shown on two sides of a corrugated container, with the company name and address in a leaf green.

The fruit is packed 16 to 18 bananas to the hand, six hands per container, making a total bulk of 40 lb.

In addition to alleviating shipping problems and presenting a good advertising medium, the package protects the fruit from damage in handling and in transit.

Container is manufactured by Boston Corrugated Div., Robert Gair Co., Inc., New York City.

For Package Data Use Reader Service

Toast Glasses as Premium

To stimulate sales of its Swift'ning, Swift & Co., Chicago, will offer during May and June a premium of individual toast glasses.

During these two months, a dozen glasses, made of clear Lucite plastic and designed with tapered stems for inserting in a cake, will be available to consumers for 50c. plus the paper disk from any can of Swift'ning.

In addition to their giving a festive air when used on cakes, many additional uses are given in a recipe folder in each box of glasses. These include employing them to hold syrup in stacks of waffles or toppings in ice cream sundaes.

keep TEFLON* in mind . . .

Teflon, duPont's new wonder plastic fabricated by the United States Gasket Company, is proving a better material for many food manufacturing requirements. Keep its unique properties in mind for such services as:

- Pump impellers that won't gall and freeze on such difficult solutions as vinegar, molasses, fruit juices, syrups, extracts.
- No-lubricant bearings that can't contaminate the product.
- No-lubricant pump and valve packing that imposes minimum torque on shafts and spindles.
- Teflon covered header rolls on bakers' dough sheeters that reduce or eliminate flour dusting; squeeze out more air.
- Teflon candy molds that eliminate the dust, mess and explosion hazard of starch molds.
- Sanitary, Teflon-covered working surfaces, conveyors, guide rails, trays, etc.—easy to clean and keep clean, bacteria resistant, non-absorbent, slippery to the stickiest substance.
- Non-contaminating, durable gaskets, expansion joints and accessories for glass and stainless steel piping.

Teflon—fabricated by the United States Gasket Company is available in sheets, tape, engineered packings, cut and molded gaskets, covered rolls, to solve many food processing problems. Ask for catalog or tell us your requirements.

UNITED STATES GASKET COMPANY

FLUOROCARBON PRODUCTS DIVISION

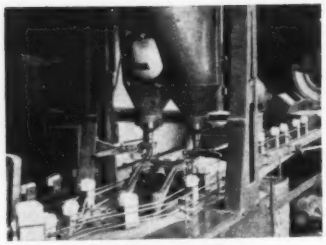
FABRICATORS OF "TEFLON", "KEL-F" AND OTHER FLUOROCARBON PLASTICS

CAMDEN 1, NEW JERSEY

*duPont's trademark for its tetrafluoroethylene resin.

SYNTRON

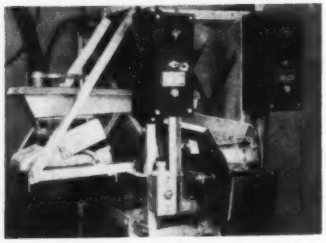
Speeds Up Bulk Material Handling with—



ELECTRIC VIBRATORS

Assure free-flowing bins, hoppers and chutes — eliminate arching and plugging and damage by pounding.

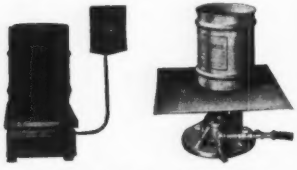
A variety of models—for small 1 cu. ft. hoppers up to huge bunkers.



VIBRATORY FEEDERS

Variable control of rate of flow—from pounds to hundreds of tons per hour of most all types of dry or damp bulk foods.

Low installation cost — low maintenance cost.



PACKERS & JOLTERS

Eliminate slow, laborious hand pounding, bumping and jarring—enable you to put more into your containers—and your customers to get more out of them.

SYNTRON CO.
460 Lexington Ave. Homer City, Pa.

New "Breader" and Precooked Pudding Powders

Two new products, a breading item and precooked pudding powders, are being introduced by Virginia Dare Extract Co., Inc., Brooklyn.

The new breading, called "Better Breader", is made of a specially prepared blend of corn and wheat products. It does not contain bread or cracker crumbs, yeast or baking powder. Milk, eggs, and seasoning are added. It is stated that it will not ferment and is unaffected by moisture. Also, it is stabilized against rancidity.

It is necessary only to moisten the food to be breaded with milk and water, coat with Breader, then fry.

This breading product is particularly recommended for foods to be put up in a freezer and is ideal for precooked frozen foods.

The product is sold in 5 lb. bags, 50 and 100 lb. drums, and in 200 lb. barrels.

The precooked pudding powders come in three flavors—vanilla, butterscotch, and chocolate. They were developed to eliminate the preparation and time necessary to produce puddings, dessert toppings, cake or pie fillers in quantity batches. It can also be used in frozen custards.

All that is necessary to secure a ready-to-serve product is the addition of milk. Two pounds of the pudding and a gallon of milk produce approximately 40 servings.

It is stated that flavor retention is maintained and there is no starchy taste. Maker states that this is due to the fact that no heat is used in the preparation and the powders are based on a processed precooked blended base of special texture.

These powders are now being packaged in 2-lb. bags, and in 50- and 100-lb. drums. Bags are supplied by Union Bag & Paper Corp., New York City.

For Package Data Use Reader Service

Skinless Sausage in Unique Tray Pack

Packed in individual trays, skinless sausages are now being marketed by Oscar Mayer & Co., Chicago.

Uniquely, the product is put up in 4-in. lengths in a continuous strip of laminated aluminum foil cardboard which is molded to form six link sausages per pack. The pack is then overwrapped with cellophane with only the company label on the top, thus leaving the product clearly visible to the purchaser.

When cooking, the sausages are not removed. The tray is merely placed sausage side down into a cool frying pan into which one or two tablespoons of water have been placed. As pan heats, tray starts to spread and it is removed with a fork.

Some of the features of the new pack are: Portion uniformity of skinless sausage, flavor protection and elim-

for a *Prize Pack* ...year after year

...it's *fmc* Specialized pea preparation and canning equipment

Keeping freshly harvested peas at their peak of perfection through preparation and canning, calls for modern production line operations with equipment specially designed and engineered for the job. In taking advantage of FMC's years of experience in this specialized field, canners are assured of increased capacities at reduced costs; top quality packs; greatly simplified operations made more profitable by continuous, automatic methods.

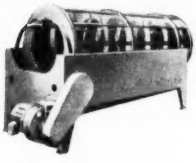
Write for full information, or call your nearest FMC representative.

fmc Tenderometer

fmc Blancher

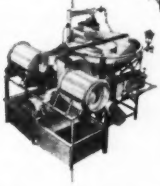
fmc Gooseneck Conveyor

fmc Twin Reel Pea Grader



fmc Rotary Pea Washer

fmc 8 Station Pea and Bean Filler



fmc (Lewis) Quality Grader

First in Diversified Food Equipment

FOOD MACHINERY AND CHEMICAL CORPORATION

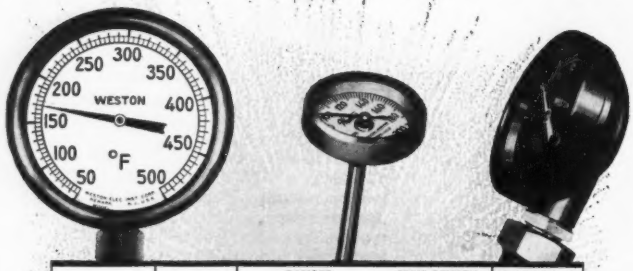
Canning Machinery Division

General Sales Offices:

WESTERN: SAN JOSE 6, CALIFORNIA **EASTERN:** HOOPESTON, ILLINOIS

Available

in broadest selection of types, ranges, stem lengths



TYPE	SCALE LENGTH	RANGES		STEM LENGTH		% ACCURACY OF THERMO. RANGE
		As low as	As high as	As short as	As long as	
Heavy Duty Straight Form	9"	—100F	+1000F	2½"	48"	1
Heavy Duty Angle Form	9 or 12"	—100F	+1000F	2½"	72"	1
Standard Angle Form	6"	—100F	+1000F	2½"	72"	1
General Purpose	4½"	—100F	+1000F	2½"	36"	1
Laboratory	3.40"	—100F	+500F	2"	24"	½ of 1

WESTON

all-metal THERMOMETERS

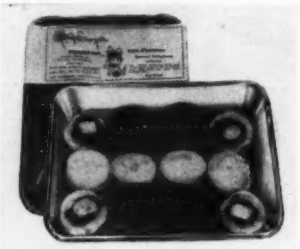
WESTON Thermometers give you *all* the advantages of all-metal construction *to an unmatched degree*. The durability of stainless steel stems . . . the readability of large, boldly marked scales . . . the sustained accuracy due to precision manufacture *proved* through the years. Order through your regular jobber, or your local WESTON Representative. Catalog T-13 on request . . . WESTON Electrical Instrument Corporation 617 Frelinghuysen Avenue, Newark 5, New Jersey . . . *manufacturers of Weston and TAGliabue Instruments.*

WESTON *Temperature Instruments* INDICATE—RECORD—CONTROL

9236

ination of handling meat. Also, it is easy to cut desired number of links from the tray with kitchen scissors.

The package was designed by the company's packaging department in its Madison, Wis., plant.



Frozen Hors d'Oeuvres

Packaged in an attractive aluminum foil tray overwrapped with cellophane, frozen assorted hors d'oeuvres are now being introduced on the West Coast by Marie Sawyer, Los Angeles. National distribution is expected to get under way in the near future.

A dozen hors d'oeuvres are in the tray—four miniature tamale pies, four pizza pies, and four cheese "dreams" making up the assortment. To be served hot, they require only 10 to 12 min. of oven heating.

The aluminum foil containers are supplied by Zellerback Co., and the cellophane overwrap by Blake Moffitt & Towne, both of Los Angeles.

For Package Data Use Reader Service

New Flavors and Extracts

Additions to its Dolco 5200 flavor line, also a new line of genuine fruit extracts, have been announced by Dodge & Olcott, Inc., New York City.

Added flavors are Banana, Butterscotch, Cassis, Black Cherry, Chocolate, Coconut, Coffee, Lime, Maple and Rum Toffee.

These flavors will find application by flavor manufacturers, bakers, and confectioners, in such products as creams, fondants, gums, jellies, cake icings, gelatin desserts, ice cream and soft drink powders, and hard candies.

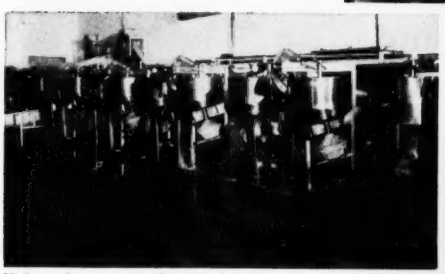
The new Dogen fruit extracts are available in a large selection of popular flavors, including Apple, Blackberry, Sweet Cherry, Black Cherry, Grape, Peach, Raspberry, and Strawberry.

As there are no added colors or flavors in these extracts, either natural or synthetic, they are particularly valuable in flavoring cordials, liqueurs, ice cream sherbets, ices, and other

IN PACKING FROZEN CONCENTRATED JUICES

"Stainless Steel is the only thing that can do the job"

says Plant Manager of the Concentrate Division, Snively Groves, Inc.



High-speed extractors split the fruit and extract the juice. These Stainless Steel units were built by Brown Citrus Machinery Co., Whittier, Calif.

Thomas V. Snively, Jr., Plant Manager (left), and C. S. Freese, Superintendent of Operations, discuss the merits of Stainless Steel. Votator apparatus for slush freezing the juice is at the right, and a surge blending tank is at the left. Both are Stainless Steel. Votator slush freezing apparatus is made by The Girdler Corp., Louisville, Ky.

THE frozen concentrated juice industry is growing by leaps and bounds. In the season just past, concentrators produced nearly 25 million gallons of frozen orange juice, plus blends and specialty juices. And Stainless Steel, in all types of processing equipment, has played a big part in this rapid expansion.

In fact, "played a big part" seems an understatement in view of this report from Thomas V. Snively, Jr., Plant Manager of the Concentrate Division, Snively Groves, Inc., Winter Haven, Fla.:

"In this operation, where we have to have a high degree of quality and constant and consistent performance, I feel that Stainless Steel is the only thing that can do the job. Certainly, it has proved its value to us, and the fact that it is used almost exclusively in the concentrate industry should indicate that there is nothing that can replace it yet."

After two seasons of use, this firm's Stainless equipment shows no appreciable wear or deterioration. It requires practically no maintenance. Routine cleaning takes place every 72 hours during continuous operation.

In addition to the ease with which it can be cleaned, Stainless Steel's high resistance to citric acid and the fact that it doesn't absorb ascorbic acid from the juice make it ideal for this application.

No matter what you process, you'll find Stainless Steel offers you many benefits that quickly offset its sometimes-higher first cost. Some grades of Stainless are now in restricted supply, but give this durable metal a prominent place in your future improvement plans.

U·S·S STAINLESS STEEL

USS

AMERICAN STEEL & WIRE .... COLUMBIA-GENEVA STEEL .... NATIONAL TUBE .... TENNESSEE COAL & IRON

UNITED STATES STEEL SUPPLY, WAREHOUSE DISTRIBUTORS .... Division of UNITED STATES STEEL COMPANY, PITTSBURGH

UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

The billion dollar fresh produce industry uses large numbers of EXACT WEIGHT Scales in modern packaging. These models, with specially built commodity holders, are handling fresh carrots.

Today's Handling and Packaging Problems...

The planning stage is the place to cope with labor shortage and cost control this year. How? By skillful use of equipment to cut manpower . . . improve quality . . . cut processing, packaging and handling time. Face the fact of general labor shortage for 1952. Equipment must substitute and since good scales are a vital link in controlling quality, recovering product, insuring uniformity and cutting costs incorporate them in your plans now. Strive for as many laborless applications as possible. You can do this with EXACT WEIGHT "Selectrol", a fully automatic application for volume high-speed checkweighing. A wide range of EXACT WEIGHT models are available for semi-automatic packaging and handling. If manual operations are necessary use modern labor saving equipment with these famous weighing units. Remember wherever there's industry there's EXACT WEIGHT Scales. You will save time and money by including them in your plans. Write for details.

EXACT WEIGHT Scale Model #213-S, the most popular consumer packaging scale—Features (1) high speed operation due to extremely short platter fall, (1/8") (2) end tower construction which takes up less bench space, and permits uninterrupted production across the scale while commodities are being weighed all in direct line of vision, 1 lb. beam, notched type. Dial 1 oz. over and under x 1/4 oz. graduation—Capacity to 3 lbs.

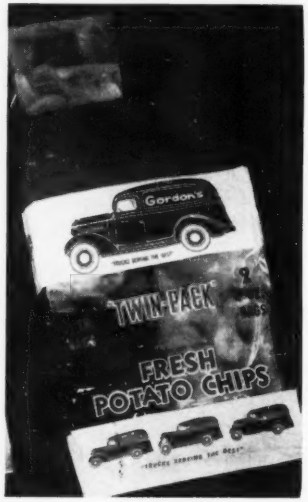
EXACT WEIGHT SCALES
Industrial Precision

THE EXACT WEIGHT SCALE COMPANY

910 W. Fifth Ave., Columbus 8, Ohio

2920 Bloor St., W., Toronto 18, Canada

foods in which genuine fruit flavorings are desired. These flavors are said to be almost entirely free from pectin, contain approximately 15 percent alcohol, and are freely soluble in water and syrup.



Multiple Packages

To insure freshness of product, two companies have introduced a new type package wherein small bags are inserted into one larger bag.

Gordon Foods, Inc., Atlanta, Ga., is now marketing its "Twin-Pack" for potato chips.

Two 8-oz. bags are packaged together in a single outer bag. The outer container carrying the distinctive Gordon truck label is clearly marked as containing two 8-oz. bags. Cellophane is used for bags distributed in Florida and along the East Coast, while Glassine is used for the balance of the company's distribution areas.

Post Trading Co., Los Angeles, is using a similar type pack for its ready-to-eat popcorn. Into a large duplex waxed glassine bag, are placed four small individual bags of the popcorn.

These new type packages enable the customer to open one bag and leave the remaining portions sealed until ready for use. Development of this type package was made primarily to maintain crispness and freshness of the products for longer periods of time.

Bags are designed, printed, and furnished by Milprint, Inc., Milwaukee.

For Package Data Use Reader Service

Waste Pollution

—Continued from page 64

ing from feed-house condensate prior to discharging to the Hammond system. These scrubbers (essentially open tanks packed with beryl saddles) present 50,000 sq. ft. surface area to the condensate fed in at the top. The condensate is aerated with approximately 25,000 cu. ft. per min. of air.

The latter is introduced at the bottom of the scrubber, causing volatiles to be forced into the atmosphere. Temperature of the aerated condensate averages 80 deg. F. against 140 deg. F. initially. This temperature reduction has proved to be an asset.

The scrubbing treatment affects an average B.O.D. reduction of 53 percent. To obtain the same reduction by conventional sewage treatment methods, the company would have had to install 1¼ acres of trickle-bed filter at an estimated cost of $200,000, plus yearly operating expenses of approximately $10,000.

These units cost $27,000 and present practically no maintenance or operating costs. They were designed, constructed, and installed by our own personnel.

The air-scrubbed condensate effluent has a normal pH of 2.0 and is very corrosive. To eliminate the hazard to sewer lines, boiler blowdown water and sludge from the lime-alum water-treatment plant were added to these condensates, thus raising the pH to 5.0. Additional lime is also fed to the water by an automatic feeder to maintain this pH at 7.0.

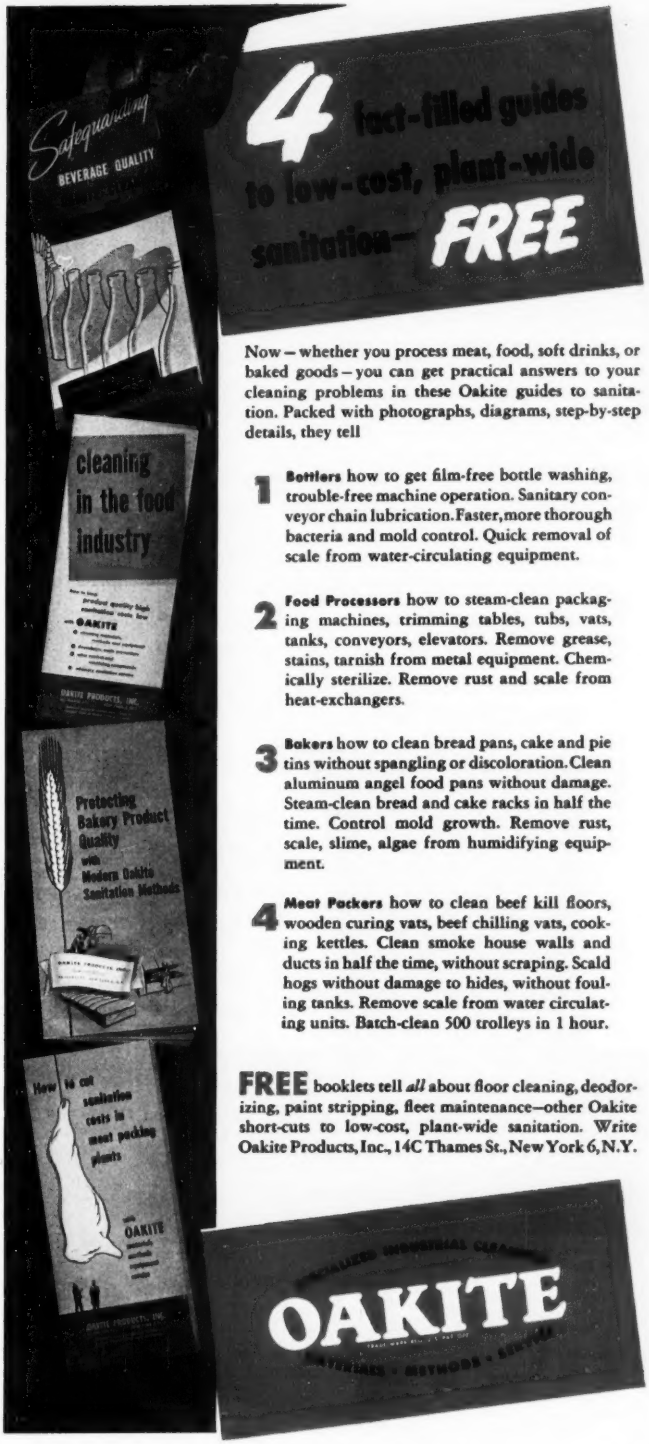
Many Problems

Effective control of industrial wastes was found to be a relatively long term proposition. The rebuilding program took five years.

During this period a new laboratory unit, of three employees, was established, and it now collects daily operational data on process equipment and checks the bio-loading of trade-waste-bearing effluents.

An intense educational program on abatement of trade wastes was initiated among all workers, with every effort made to gain their trust and backing. Opposition to the "tightening down" was naturally great at the onset, but finally foremen and personnel alike awoke to the fact that their jobs were actually made easier by most of the reforms. The incidence of spills and unreported accidents lessened.

At the end of 1949 the company had reduced total bio-loading to the sewer systems by 66 percent from


Safeguarding
BEVERAGE QUALITY
cleaning in the food industry
OAKITE
Protecting Bakery Product Quality with Modern Oakite Sanitation Methods
How to cut sanitation costs in meat packing plants
with OAKITE
4 fact-filled guides to low-cost, plant-wide sanitation— FREE
Now – whether you process meat, food, soft drinks, or baked goods – you can get practical answers to your cleaning problems in these Oakite guides to sanitation. Packed with photographs, diagrams, step-by-step details, they tell
1 Bottlers how to get film-free bottle washing, trouble-free machine operation. Sanitary conveyor chain lubrication. Faster, more thorough bacteria and mold control. Quick removal of scale from water-circulating equipment.
2 Food Processors how to steam-clean packaging machines, trimming tables, tubs, vats, tanks, conveyors, elevators. Remove grease, stains, tarnish from metal equipment. Chemically sterilize. Remove rust and scale from heat-exchangers.
3 Bakers how to clean bread pans, cake and pie tins without spangling or discoloration. Clean aluminum angel food pans without damage. Steam-clean bread and cake racks in half the time. Control mold growth. Remove rust, scale, slime, algae from humidifying equipment.
4 Meat Packers how to clean beef kill floors, wooden curing vats, beef chilling vats, cooking kettles. Clean smoke house walls and ducts in half the time, without scraping. Scald hogs without damage to hides, without fouling tanks. Remove scale from water circulating units. Batch-clean 500 trolleys in 1 hour.
FREE booklets tell all about floor cleaning, deodorizing, paint stripping, fleet maintenance—other Oakite short-cuts to low-cost, plant-wide sanitation. Write Oakite Products, Inc., 14C Thames St., New York 6, N.Y.
OAKITE

Introducing a New, Rugged All-Crinkled Bag

TUFPAK

Here's a really tough multi-wall bag that will protect your product and save you money. Consider these TUFPAK features:

- 2 to 6 plies extra-strong crinkled kraft paper.
- Made to order in any combination of plain . . . wet-strength . . . wax-treated . . . waterproof . . . mesh-reinforced . . . or polyethylene coated plies. Polyethylene liner also available.
- The *only* all-crinkled bag supplied in 10″ to 44″ widths.
- Resilient and flexible—absorbs shock, rough handling.
- Creped surface takes slip and slide out of stacking.

TUFPAK—the ideal shipping container for chemicals, foods; powdered, granulated, or crushed products.

NATIONAL WATERPROOF PAPERS, INC.

Manufacturers of Protective Papers, Liners and Bags Since 1903

104 Beckett Street

Camden 3, New Jersey

Send coupon below for sample bag and complete information

National Waterproof Papers, Inc.
104 Beckett St., Camden 3, N. J.

Please send me a sample bag and full details on TUFPAK as indicated below:

Product to be packed.....

Size of Bag..... Wt. of Contents.....

Company.....

Address.....

.....

Individual.....
(Please Print)

NATCO

Ree Pend

1944. All major changes had been completed, but the new technics and equipment had to be "shaken down" to normal operating efficiency.

It was later found necessary to eliminate floor-drain connections from the sewer system. The permanent 10-acre lagoon was rehabilitated and facilities installed for its reception of refinery evaporator pan boil-out water.

But the company was unable to reduce sewage load from the oil refinery without installing approximately $100,000 worth of equipment. Since this was a small department and its returns did not justify additional expenditures, refined oil operations were discontinued.

At the onset of the trade-waste abatement program, the company realized that the bacterial condition of waters discharged back to Lake Michigan would be an important factor. Installation of an incoming raw-water chlorination system, as against the older outgoing treatment, now insures a coliform bacterial kill in all water discharged. Incoming raw lake water is chlorinated at a rate sufficient to maintain a free chlorine residual of 0.5-0.8 ppm. in waters sewered back to the lake.

Influent chlorination ran chlorine costs somewhat higher than effluent chlorination. But the benefits derived more than offset the cost. Heat exchanger and condenser efficiency, for example, was improved, which in turn was reflected in lower cooling water pumping costs. There was also less down-time for maintenance of the condensers—thus extending service life of the equipment.

End (*Resume reading on page 65*)

Top-Quality Drying

—*Continued from page 60*

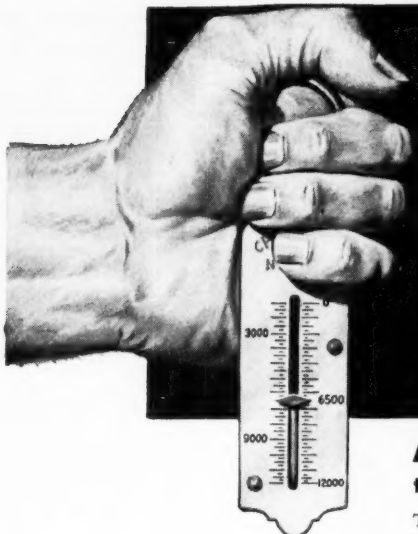
suitable to the particular product to be processed. The power provided must therefore be based on adequate product and design data.

F. *Evaporation Capacity*—This is a function of initial moisture content, permissable inlet temperature, and particle characteristics (including thickness and diffusion rate). However, with favorable conditions the maximum evaporation capacity is about 300 lb. per hour per square foot of cross section.

G. *Floor Space & Flexibility of Arrangement*—While heights are 25 to 55 ft., floor space requirements are very low. As an example, a dryer with a nominal evaporating capacity of 4,000 lb. per hour—including an 8 million Btu. oil furnace—occupies an area 16 ft. by 26 ft.

Stripped of Excess Weight

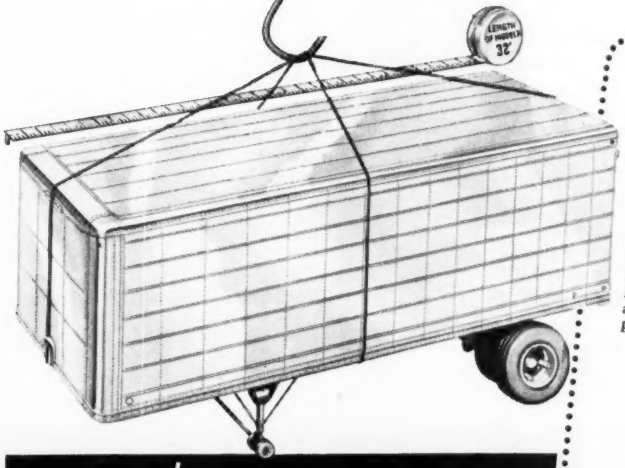
. . . to cut costs
. . . boost payloads



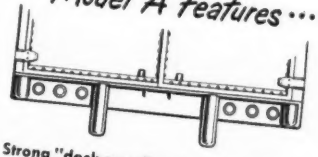
A Stronger, Lighter Aluminum Trailmobile to Help You Beat Rising Operating Costs!

The new, lighter Model "A" aluminum Trailmobile will help combat today's heavy operating costs. Short radius corners that provide more loading space at the front end, and an interior that is a full 90 inches wide, are two of its many features that increase payloads as much as 15%!

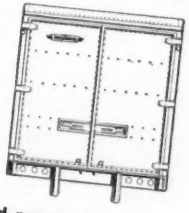
Improved Trailmobile design combines lightweight with load-carrying strength. It makes the Model "A" easier to pull and easier to maintain.



Model "A" Features



Strong "dock-proof" rear end design—Four husky steel bumpers give full protection against dock damage. Corner bumpers are backed by outside rails . . . extra long center bumpers are backed by the sub-frame to protect against low loading docks. Heavy, steel tail-shelf adds strength between bumpers and protects recessed tail lights, reflectors.



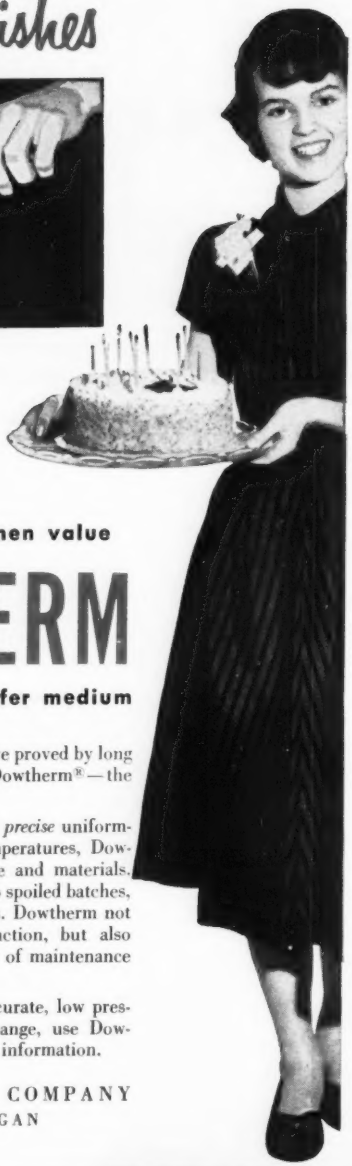
Recessed pressure-type door locks—Recessed within the doors to prevent dock damage, these locks draw doors tight to insure load safety and keep out water and dust. Individual locks on each door permit one to be opened while the other remains securely locked.

The Trend is to TRAILMOBILE

TRAILMOBILE INC.
Subsidiary of Pullman Incorporated
Cincinnati 9, Ohio • Berkeley 10, California
Friendly Sales and Service from Coast to Coast

from finishes

to food!



wide-awake process men value

DOWTHERM

the MODERN heat transfer medium

Process men in many industries have proved by long use the economies offered by Dowtherm® — the *controlled* heat transfer medium.

Operating *at low pressures* and with *precise* uniformity over a wide range of high temperatures, Dowtherm effects vital savings in time and materials. Uniform temperatures put an end to spoiled batches, costly shutdowns and replacements. Dowtherm not only increases quality and production, but also assures efficiency with a minimum of maintenance and operating costs.

Where your operations require accurate, low pressure heating in the 300°-750°F. range, use Dowtherm. Write to Dow for complete information.

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

THE DOW CHEMICAL COMPANY
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MIDLAND, MICH.
"Tell me more about DOWTHERM."

Name _____ Title _____
Company _____
Address _____
City _____ State _____

DOW
CHEMICALS
INDISPENSABLE TO INDUSTRY AND AGRICULTURE

H. *Control System*—The dryer may –and normally is–placed under fully automatic control. Instruments include:

1. Temperature control. Bulb is placed in dryer or blower outlet to assure constant final temperature. Through a suitable instrument and actuating device, the fuel supply is increased or decreased to take care of feed variations–either a weight change at constant moisture, a moisture change at constant weight, or both. The instrument is usually provided with a second pen and bulb for recording inlet temperatures.

2. Air volume control. A static or velocity head fitting suitably placed to initiate louver movement through the instrument-actuating mechanism—to provide constant volume under a varying load.

3. Secondary instruments. These are to operate air-dilution louvers for 2nd and 3rd stages, and for furnace control or secondary temperature or pressure indication.

End (*Resume reading on page 61*)

Quality Preserves

—*Continued from page 79*

has been provided, another requirement is to avoid high processing temperatures that might cause color or flavor changes in the syrup. Both temperature and time of exposure are influencing factors. Up to about 100 deg. F. is considered safe for normal storage periods. High storage temperatures for long periods will cause a noticeable change in the flavor and color of corn syrup as well as in sucrose syrups.

To prevent heat changes in sugars, it is therefore basic to control processing temperatures carefully. High-quality preservers are using the following procedures in order to avoid undesirable changes:

Jellies—Corn syrup is particularly easy to use in apple-base jellies, which comprise about 40 percent of the country's entire jelly pack. In the majority of these products, an apple concentrate containing approximately 70 percent solids is used, together with the desired juices, sweeteners, water, and other ingredients.

Water in varying amounts is always added in this type of jelly formula so that water content of the corn syrup is not critical. With combination sucrose-corn syrup sweeteners, the only change in formulation, as compared with an all-sucrose sweetener, is proportionately less water. In preparing these products, the ingredients are simply

12HR—COMPLETE UNION
15R—THREADED FERRULE
9—CROSS
2P—45° SWEEP ELL
2C—90° SWEEP ELL
7—TEE
10CPL—LIFT-TYPE PLUG VALVE
TRI-CLOVER PUMPS—Available in a full corrosion-resistant line for practically all sanitary and industrial applications.
Try
TRI-CLOVER
Stainless Steel
APPROVED
Sanitary Fittings
—AVAILABLE FROM STOCK
Here is an opportunity for you to bring your sanitary liquid conveying lines up to date—with Tri-Clover Stainless Steel Sanitary Fittings. Tri-Clover offers a complete line of types and sizes, from 1 in. through 4 in. . . . most of which are now available for delivery from stock . . . and *all* of these fittings are designated and accepted as meeting the 3A Sanitary Standards by the appropriate committees of the International Association of Milk Sanitarians . . . U.S. Public Health Service . . . and the Dairy Industries Committee.
And remember—you are assured of highest quality workmanship and material in every Tri-Clover product—a reputation gained in over 30 years of specialized experience.
Write for further details on fittings to fit your needs.
S-152
Tri-Clover®
MACHINE CO.
Kenosha, Wisconsin
STAINLESS STEEL SANITARY FITTINGS, VALVES, SPECIALTIES
FABRICATED STAINLESS STEEL INDUSTRIAL FITTINGS AND INDUSTRIAL PUMPS
THE Complete LINE

WE CALL 'EM

Waterproof Bags

...BUT...THIS KIND OF PROTECTION IS ONLY ONE OF THEIR FUNCTIONS

Bemis Waterproof Laminated Textile Bags are extra strong, and they're specially constructed to guard against:

- Change in moisture content
- Sifting
- Escape of undesirable odors
- Loss from snagging and tearing

Up to 5-Layer Construction:

1. Flexible creped kraft paper*
2. Waterproof adhesive
3. Middle layer of paper
4. Waterproof adhesive
5. Outer layer of burlap or cotton

*This may be parchment paper, or various plastic films, depending upon your requirement.

Bemis

"America's No. 1 Bag Maker"

408-C Pine St., St. Louis 2, Mo.

If you have a "hard-to-pack" product or one that must stand the rough handling of l. c. l., truck, or export shipment, it will pay you to investigate the advantages of Bemis Waterproof Bags.

MAYBE YOU NEED THESE, TOO

If you don't require the exceptional protection of Bemis Waterproof Bags, Bemis Multiwall, Cotton or Burlap Bags are your best bet.

WHATEVER KIND OF BAG YOU NEED, WE MAKE IT!

mixed together in a kettle, brought up to a boil, and packed.

When juices of low-solids concentration are used, water is not added to the mixture. On the contrary, moisture content must be reduced so that the jelly will have the minimum percentage of water-soluble solids (65 percent) per Federal standards.

Use of corn syrup, then, means still more water to be evaporated. When evaporation is accomplished by boiling in an open kettle, the employment of corn syrup (requiring somewhat more boiling) may cause slight flavor changes in certain types of jelly. But if the syrup is preheated in a steam-heated exchanger, almost-boiling syrup may be added to the batch of jelly *after* the boiling step.

This procedure will minimize off-flavors, prevent a temperature drop in the kettle (which would occur if cold syrup were added), and permit the preserver to fill his jelly at sterile temperatures. Naturally, if the concentration takes place in vacuum pans—as is done in many modern plants—the problem is not as serious.

Jams and preserves—Preparation of jams and preserves is somewhat different because of the cooking required. Most makers of high-quality preserves employ vacuum pans for this operation where cooking temperatures are low enough to eliminate undesirable heat effects.

The procedure usually followed with jams and preserves is to mix all ingredients together except the corn syrup, using heat to facilitate the mixing. The syrup is added just before the batch is introduced into the vacuum pan. Since the syrup temperature is considerably below that of the other ingredients, the temperature of the final mixture is quickly reduced.

Fruit butters—A still different procedure is followed when preparing fruit butters. Here, ingredients are cooked in open kettles at relatively high temperatures for considerable periods of time in order to develop desired flavor and reduce moisture.

All ingredients except the corn syrup are usually mixed together and cooked in this manner. The moisture content is reduced below the desired level of the finished butter to compensate for syrup moisture. Syrup is added near the end of the cooking cycle so that it only undergoes a short exposure to the cooking temperatures.

By following the few simple methods outlined above, manufacturers of high-quality jellies, jams, preserves, and fruit butters are enjoying the advantages that corn syrup brings to their products, while often realizing a measure of cost saving into the bargain.

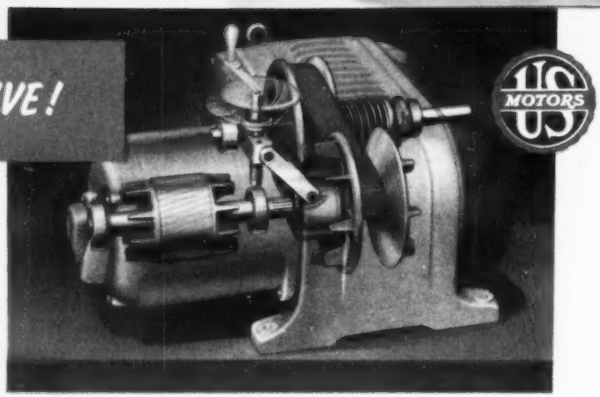
End (Resume reading on page 80)

every speed with Varidrive

You simply turn a control handle! Instantly the speed of the Varidrive changes to the exact rpm you need. The productive scope of your powered machines and equipment will be greatly increased. Your operators can produce more output every hour.

U.S. Varidrive Motors

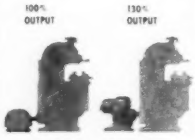
GO MODERN—GO VARIDRIVE!



Get any RPM

YOU GET THESE EXTRA ADVANTAGES IN THIS MIRACLE MOTOR

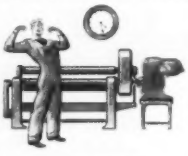
ANY SPEED
BY TURNING A DIAL



INCREASES PRODUCTION
UP TO 30%

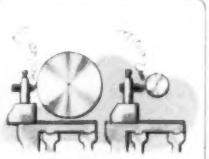
NO BELTS TO SHIFT
NO GEARS TO CHANGE

ELIMINATES EXTRA
CONTRAPTIONS

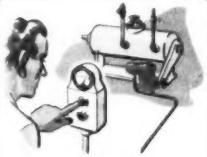


REDUCES FATIGUE
GIVES WORKER INCENTIVE

CHANGES SPEED TO
FIT WORKER'S RHYTHM

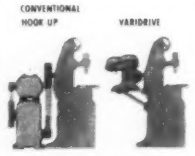


GIVES EXACT SPEED
FOR SIZE OF WORK

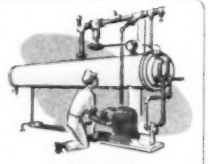


LOCALLY OR
REMOTELY CONTROLLED

IMPROVES QUALITY
OF MACHINE WORK



COMPACT—CAN INSTALL
DIRECT ON MACHINE



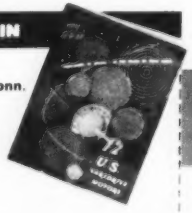
PERMITS FINEST
PROCESS ADJUSTMENTS

VARIOUS TYPES
2 TO 10,000 R.P.M.

Machines with only 1, 2 or 3 speeds can't give maximum output. *Keep pace with progress.* Take full advantage of your machine's unused production. Give it infinite variations of speeds best suited to the job and to the operator's ability.

Many users of U. S. Varidrive Motors obtain 10 hours' production in 8 because the operator can select just the right speed for each operation. He gets it *instantly* by merely turning a control dial. He speeds up his work to synchronize with his rhythm of movement. He sets the speed faster for quick work, slower for very precise operations. *Install Varidrives and save.*

MAIL COUPON FOR VARIDRIVE BULLETIN



U. S. Electrical Motors, Inc.
Los Angeles 54, Calif. (Box 2058) or Milford, Conn.

Send VA Varidrive Motor Bulletin

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE___ STATE_____

U.S. VARIDRIVE MOTOR

Mechanizes for Efficiency

—Continued from page 67

40 4-in. pies at a time into a 75-ft. traveling oven.

This is a simple contrivance, basically comprising a chain-driven pusher bar mounted on roller wheels that ride over a pair of 2-ft. long tracks—one above the other. Movement of the bar is forward and backward.

As the bar goes forward on the lower track, it shoves a row of pies into the oven. At the end of the forward travel, the rollers climb 45 deg. onto the upper track, upon which they ride backward. Reaching the end of the track, the rollers then drop onto the lower track by means of a pair of angle-iron frames, each with two coil springs. Now, the pusher-bar is ready for its next load as the angle-iron frames spring back into position.

Speed of the pusher bar is synchronized with speed of the oven.

The switch from wooden to stainless steel pie racks was made for three reasons: The latter last longer, are easier to clean, and cool pies 28 percent faster.

8—Rapid Cooling

A significant production stepper-upper and space-saver has been the installation of an air-conditioned cooling room. Ten racks of pies are held from 30 to 60 min. at 60-65 deg. F. and at 75-85 percent relative humidity.

There is another advantage: Less cripples occur on the packaging lines. Formerly, pies going to the wrappers tended to be more warm and brittle.

Approximately 75 percent of the pies are bagged and the rest automatically cartoned. From the 2nd floor packaging lines, pies are conveyed to shipping (floor below).

Still another improvement boosting productivity is the new location of our automatic pie-plate washing machine on the second floor, adjacent to the pie-making line. Formerly, this machine was on the 1st floor, far removed from the pie line.

Empty pie plates are loaded onto a triple-decker rack, each deck holding 2,500 tins. Plates are next fed onto a wire-mesh conveyor that travels through the triple-duty washer.

While moving on the belt, the pie tins are first sprayed with 160-deg.-F. detergent fed under 40 psi. from nozzles above and below.

Next, the pie plates go to the rinser, where 140-160 deg. F. water is sprayed on them from nozzles. Then, the plates travel through a gas-fired dryer, having an automatic controller that maintains a constant 275-deg.-F.

End (Resume reading on page 68)

the modern answer for superior seasoning

Do you require a dry or liquid seasoning for prepared meats such as Bologna, Braunschweiger, Deviled Ham, Liverwurst, Turkey Loaf, Salami—

Or a basic spice seasoning such as Allspice, Cinnamon, Clove, Garlic, Nutmeg, Onion, Black Pepper...?

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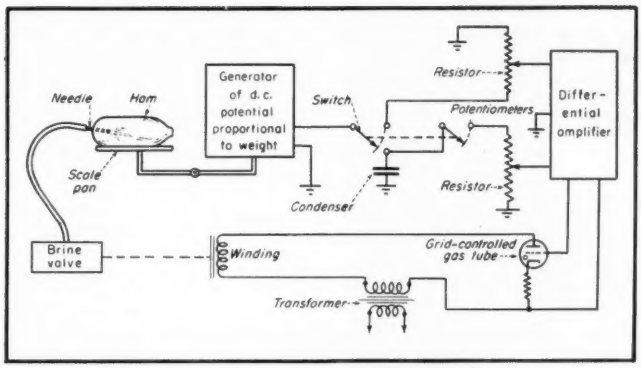
ADVANCES IN TECHNOLOGY



Electrically Controlled Weighing System Gives Uniform Brining of Ham or Bacon

Controlling increases in the weight of a food product such as ham, into which brine is pumped during processing, is the object of two recently patented systems.

In operation, a scale first determines the base weight of the product prior to processing. In determining this weight it operates some means of generating a potential whose value is a linear function of the base weight. (See drawing above.) Generator may be a valve controlling the amount of light falling upon a photoelectric cell, a simple potentiometer system, or a variable condenser.

The potential corresponding to the base weight of the product is used in a bridge which is brought to balance, an arm of the bridge being varied in proportion to the base weight potential. The bridge is then unbalanced by a predetermined amount, and processing of the ham is begun by pumping brine into its arteries. The sense of unbalance of the bridge is such that the increase in weight during pumping tends to bring the bridge into balance. When the bridge has regained balance, processing is terminated.

Digest from U. S. Patents 2,581,204-5, issued Jan. 1, 1952, on applications dated June 7, 1950, to George W. Reilly, Jr., Minneapolis, Minn., and assigned to Wilson & Co., Inc.

• • •

Protecting Fish Quality

British fisheries consist largely of white fish, consumed mostly in the fresh state, and of herring which are marketed both fresh, and salted and kippered. The white fishes, such as cod, if promptly gutted and stowed in ice, remain really fresh for about a week, but become stale in about 2 weeks. Since a voyage to the fishing grounds takes about 5 days, a round trip cannot extend over 17-18 days if fresh fish is to be landed.

Complete surrounding of the fish by ice is necessary to maintain proper temperatures, and well insulated holds will improve the condition of fish brought to port. Deep stowage should be avoided by shelves in the holds or by the use of boxes.

Cod and haddock at the bottom of stowage 4-5 ft. deep, in ice for 17-18 days, will lose 13-14 percent of their weight, while fish at the top of the stowage lose only 2-3 percent. About half of the protein can be lost from fresh ice-stowed fish under pressure, by the water from the melting ice washing over them.

Herrings are caught mainly on overnight trips but are more perishable than white fishes. They do not remain fresh for more than about 2 days, but are fairly palatable for 4-5 days. More easily damaged than white fish, and containing a readily oxidizable oil, they should be iced from the time of catching until they reach the consumer. Stowage in shallow boxes is recommended. Evisceration of herring at sea is impracticable, but should be performed as soon as possible after landing the catch.

Fresh fish shipments should have a ratio of fish to ice of 2 to 1 in the summer months rather than the 7 to 1 ratio often used. For retention of high quality, freezing as soon as possible is the best means of insuring freshness. Storage at −5 to −20 F. and glazing to protect surfaces is recommended.

Digest from "Factors in Distribution Affecting the Quality of Fish", by G. A. Reay, *Chemistry and Industry*, 1019-22, Nov. 24, 1951.

CANNING

Foods In Sealed Cans Sterilized Electrically

Electromagnetic and electrostatic waves of certain frequencies can be used to kill microorganisms that cause spoilage of canned foods; and the process can be carried out in sealed containers.

According to patent specifications, conventional cans may be used if a rod or tube is soldered or otherwise secured to the inside of the bottom plate. This rod forms one-half of a dipole antenna, the other half being the wave-guide rod in the apparatus through which the cans travel, and in which sterilization takes place. Time required for sterilization is so short that no heating of the food takes place.

As applied to a processing plant, the apparatus comprises a radio frequency or radar frequency oscillator connected to a modulator. The modulated output of the oscillator is cou-

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pled to a wave guide that curves to overlie the oscillator and terminates in an appropriate load, such as graphited sand. Wave guide is preferably of rectangular cross section.

In operation, cans are conveyed across the wave guide by the intermittent action of a belt which causes the cans to stop momentarily in predetermined positions where they are irradiated. Three cans are positioned on the wave guide at all times so that the rod inside the can is immediately over and in contact with the wave-guide rod. Since the movement of the belt is intermittent, each can pauses three separate times on the wave guide for treatment, either at the same modulation frequency or at three different frequencies, according to the type of microorganisms to be killed.

Digest from U. S. Patent 2,576,862, issued Nov. 27, 1951, on an application dated June 11, 1946, to K. A. Smith, Burbank, and A. L. Grinnell, Los Angeles, Calif., assigned to Electronic Chemical Engineering Co., Los Angeles, Calif.

CEREAL PRODUCTS

Prepared Pastry Flour

A method of producing an improved prepared flour for making French crullers, cream puffs and eclairs has been recently patented.

Method comprises boiling flour in water in the presence of shortening until the flour is gelatinized, cooling to below cooking temperature, adding eggs and milk, dehydrating and grinding to produce a dry powdery flour in which the ingredients are in approximately the proportions required for the pastries.

Digest from U. S. Patent 2,567,815, issued Sept. 11, 1951, on an application dated July 1, 1947, to A. Kipnis, Forest Hills, N. Y.

Dipping In Water and Drying Loosens Skins of Peanuts

A new method for removal of skins from peanut kernels prior to solvent extraction produces a meal with superior color and flavor to other solvent-extracted meals. The method comprises water-treatment, drying and blanching in a standard split-nut blancher. Optimum conditions for approximately 98 percent skin removal from U. S. No. 1 shelled Spanish peanuts are water-treatment at room temperature to gain not less than 20 percent, drying with forced circulated air at 120-125 F. to approximately 4.5 percent moisture, and blanching.

Meal prepared by hexane extraction of the skinned No. 1 kernels had color and flavor characteristics

superior to other hexane-extracted meals for food utilization. Protein prepared from this meal has a light color equal to that produced from kernels treated with a solution containing 0.5 percent lye.

The method does not give satisfactory results with either shelled No. 2 or oil mill stock kernels.

Digest from "Pre-Treatment of Peanut Kernels for Effective Skin Removal," by J. Pominski, E. L. D'Aquin, L. J. Molaison, E. J. McCourtney and H. L. E. Vix, *The Journal of the American Oil Chemists' Society*, 48-51, Feb. 1952.

SANITATION

Estimating Toxicity

Fumigants and other chemicals may be toxic to organisms by: (1) Forming chemical compounds with the organisms' tissue compounds; (2) being metabolite analogues; (3) their surface-active properties, and (4) physical toxicity.

Physical toxicity is now believed to be due to a limiting concentration in some "biophase" of the organism, beyond which the compound becomes toxic.

By using Uhlig's equation, and the known toxicity of certain gases toward grain weevils, and calculating the toxic concentration in the biophase it is found that this concentration is of the order of one gram mol. per liter. Furthermore the biophase appears to be the same, or at least similar, for all organisms to which the method has been applied. It also appears that in organic compounds the substituent groups each have their own toxicity factors which are additive. Hence the toxicity of a new or unused compound can be estimated with a fair degree of accuracy, due regard being given to species sensitivity.

Digest from "The Physical Toxicity of Chemicals. I. Vapours" by J. C. McGowan, *Journal of Applied Chemistry*, Vol. 1, Suppl. Issue 2, S129-36.

DAIRY

Pasteurizing Dairy Products In Small-Tube Exchanger

Heating coffee cream to high temperatures in a small-tube exchanger reduces fat globule size and viscosity of the product, but increases its ability to color coffee.

These were some of the results obtained from experiments in which freshly separated cream was standardized to 20 percent fat, preheated to 120 F., heated to 170-300 (in 10 deg. increments) in a Mallorizer employing 0.25 in I.D. tubes, in 3½-4

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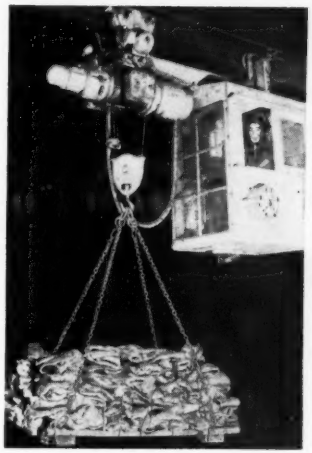

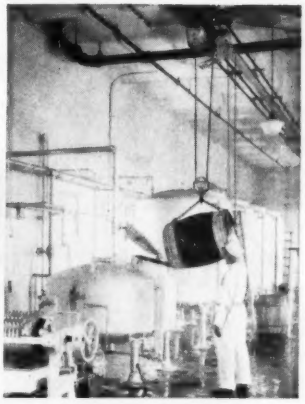

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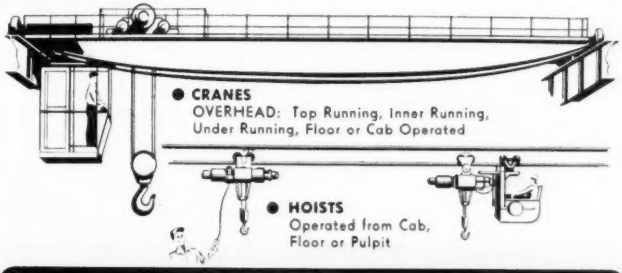
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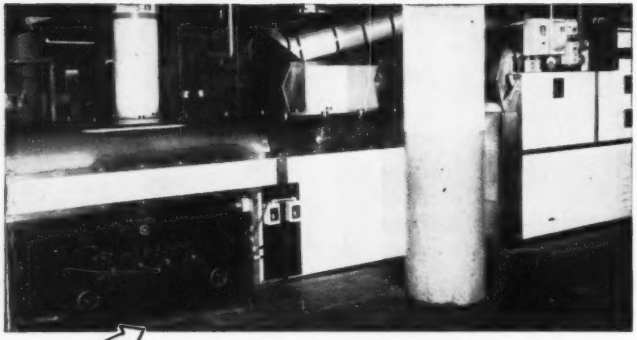
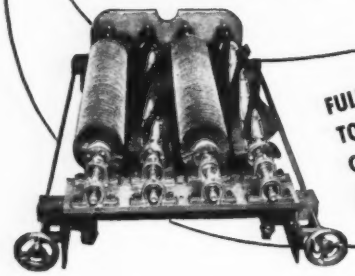


Keeps Ovens Running 24 Hours a Day!



FULLER BUILDS MACHINE TO PROVIDE CONTINUOUS CONVEYOR CLEANING at BURRY BISCUIT

When the ovens were set up at The Burry Biscuit Co., Elizabeth, N. J., Burry officials wanted to keep them running 24 hours a day. For continuous operation it became necessary that the Swedish steel conveyor belts be cleaned of deposits continuously.

The Burry people turned to engineers of The Fuller Brush Company for assistance. Fuller engineers designed an improved band cleaning unit to fit under the belt on its return loop to the oven. This machine, manufactured in the Fuller shop, has 4 Fullergript brushes: — 2 steel wire brush coils and 2 nylon filled buffing brushes. The wire brushes thoroughly scrub the hard baked deposits and the nylon brushes buff off the flour and dust.

The brushes are easily and quickly changed. The whole brushing unit may be brought down onto 4 casters and then rolled out from under the belt. A special type of stub shaft at each end of the brush core permits removal of the brushes without disturbing the shaft bearings.

The continuous cleaning provided by the Fuller machines makes it possible for The Burry Biscuit Co. to keep their ovens in operation right around the clock, turning out the famous Burry products.

If you have a situation requiring a special brushing machine, no matter what your product, why not consult us. Our engineers will work from your specifications or start from scratch if you'll outline your problem. Just write to . . .

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sec., held 2.1 sec. in a 1-in. tube, and cooled in the Mallorizer.

In the raw cream, 67.2 percent of the fat globules were 3 μ or less in size; in that heated to 180, 84 percent were in this group, and in that heated to 300 F. 95.2 percent fell below 3 μ. Viscosity was reduced almost 50 percent by heating above 170 F., whereas neither pH nor titratable acidity were changed. A cooked flavor was detectable at 220 F. and increased in intensity as the temperature was raised. Stability of the cream in coffee was not affected, but its coloring ability was increased.

In preliminary studies, made to determine the capacity of the heat exchanger, rate of flow of different products (water, milk, ice cream mix, 12 percent sucrose solution and 20 percent cream) was found to vary little when they were supplied to the unit at a pressure of 2,000 psi.

Digest from "The Effect of Heating Cream in a Small-Tube Heat Exchanger on Some of Its Properties," by E. O. Herreid, K. M. Shahani, C. J. DuPuy and P. H. Tracy. *Journal of Dairy Science*, 13-20, Jan. 1952.

FATS AND OILS

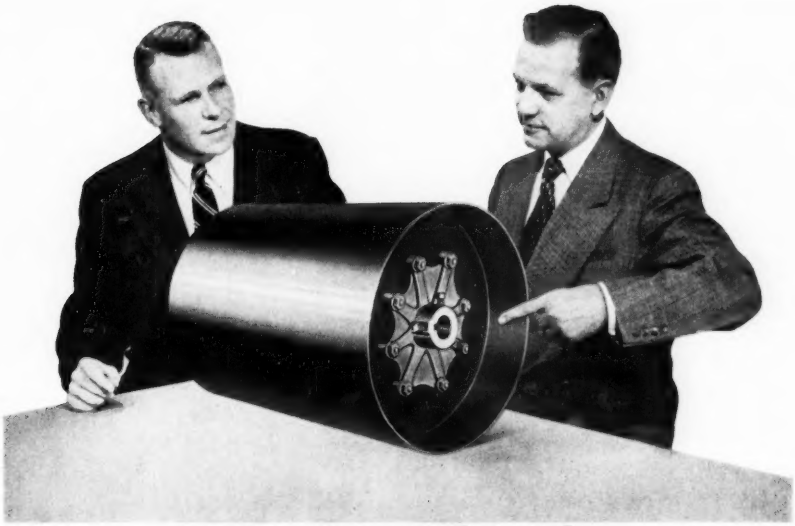
Effect of Trichloroethylene On Hydrogenation of Oils

At concentrations above 0.003 percent, trichloroethylene (TCE) will retard the rate of hydrogenation of vegetable oils. However, each of the three most common methods (2 centrifuging and kettle) of refining crude oils removes large quantities of the solvent, thus enabling the refined crudes to be hardened with little or no difficulty.

In laboratory and pilot investigations, carried out to check the theory that it is impossible to hydrogenate TCE-extracted oils because of residual solvent not removed during processing, varying percentages of TCE were added to refined and bleached, mechanically expressed soybean and cottonseed oils.

Samples were hydrogenated in a small glass lab reactor, and dead-end types of metal converters (3-1. and 2,500-lb. capacity). As little as 0.01 percent TCE exerted a marked inhibiting effect on hydrogenation of both oils, and 0.1 percent stopped the operation entirely in the case of soybean oil.

Addition of more catalyst to soybean oil containing 0.03 percent TCE, and cottonseed oil containing 0.01 percent, greatly accelerated hydrogenation. Addition of catalyst in two portions gave results superior to those obtained when it was all added at one time.



Let's See Why This Belt Conveyor Pulley is Best—For You

The pulley equipment on your belt conveyors or elevators has a lot to do with their performance. American steel Conveyor Pulleys, designed from research, are built by tested, controlled, precision methods, to treat belts extra well while themselves standing up indefinitely to the wear, tension and torsion imposed on them. Truly they are *Built* for the *Belt!*

Four standard constructions . . . more than 400 sizes from 6″ x 12″ to 60″ x 63″, for $\frac{1}{2}$″ to 10″ shafts. Totally enclosed—dirt and splashproof—they are very light, size for size, yet unbreakable.

Rims are accurately formed of metal thickness to suit pulley size and service. Crowned or straight across entire face—whichever promotes longest belt life.

Exclusive disc and hub construction: Discs don't break, hubs don't wear nor walk on shafts, pulleys are concentric, keyways positively in line. Advanced welding techniques provide extra strength and maximum penetration at all joints.

NEW! Exclusive GRIPLEX® *Spiralagging.* Extra strong duck with top quality, extra thick rubber anchored to pulleys by special adhesive and just a few bolts—countersunk for long life and better belt protection.

NEW! "HD" *heavy-duty* pulleys with Wedg-Tite hubs have a bulldog grip on shafts

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TYPE "O"—split type for mounting in tight spots like elevator casings.

TYPE "L"—for light duty—top quality at minimum cost.

TYPE "N"—for general duty—interchangeable hubs make installation or relocation easy . . . hubs tapered-fit for more efficient torque transmission—minimum bolt strain.

TYPE "HD"—for heavy duty—split tapered hubs have positive clamp grip on shaft . . . speed installation or removal.

Pulleys available almost everywhere from local distributors—backed by large factories and warehouse stocks.

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Positive, automatic control of drying temperatures is maintained, and variable feed rate provided for different material drying characteristics. Built in sizes from 2' x 10' to 3' x 24', units are available in plain or stainless steel, or pure white POROX lining. Write!

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Varying quantities of TCE were added to crude oils followed by refining by 3 methods, bleaching and hydrogenation. Crude oils to which 0.03 percent TCE was added before refining gave faster rates of hydrogenation than refined oils to which 0.01 percent was added.

Digest from "The Effect of Trichloroethylene in the Hydrogenation of Soybean and Cottonseed Oils," by F. A. Norris, K. F. Mattil and W. J. Lehmann, *The Journal of the American Oil Chemists' Society*, 28-32, Jan. 1952.

CONFECTIONERY

Appraisal of Raw Cocoa Beans

Taste tests by both experts and consumer panels, on chocolate milled from different lots of beans, showed that some of the criteria of quality that have been suggested have no bearing on chocolate quality. Examples are: Thickness, weight and length, or sprouted condition of the beans.

Degree of fermentation as indicated by the color, and moldy beans, can be distinguished in the finished chocolate. Insect damage cannot be detected, partly because the insects and their excrement are removed in cleaning and winnowing. For aesthetic reasons, however, wormy beans should be penalized.

An appraisal basis is suggested in which the lot is first sampled according to a predetermined plan, then cut and assessed on a sample of 200-1600 beans. Penalty points are given for beans that are poorly fermented, as indicated by their yellow, purple, or slaty color, insect damaged, or moldy. Middling beans could accumulate 7-12 penalty points; very bad ones would have more than 25 penalty points. A standard laboratory method of milling the beans and a standard chocolate formula for taste testing is also proposed.

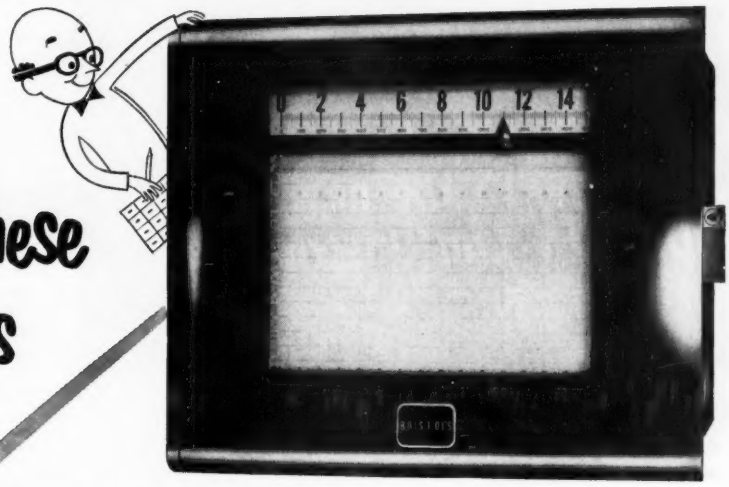
Digest from "New Bases for the Appraisal of Raw Beans" by Werner Ammann, *International Chocolate Review*, 4-5, Jan. 1952.

FRUITS AND VEGETABLES

New Pre-Freezing Treatment Holds Fresh Apple Flavor

A new type of uncooked frozen apple slices and pulp which retains the natural fresh fruit flavor and is an excellent base for sauce, sherbet and ice, has been developed.

Essentially, the process consists of treating apple slices with a combination of antioxidants, freezing and pulping in the frozen state. Upon addition of about 10 percent sugar



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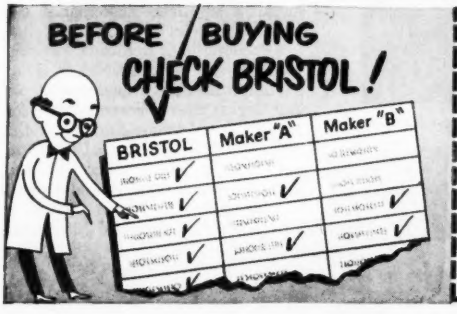

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Completely automatic, the new Dudley "roll-off" can unscrambler eliminates the need for labor, feeds cans to labelers in a steady, fast stream . . . *gently.*

Operates on all cans, 6 oz. to No. 2½ tins. Simple side mounted lever adjusts in two minutes.

Model 400 Dudley Can Unscrambler has 4 lanes; these lanes can be varied to exactly match capacity requirements of any large run.

Model 100 has single lane, for use on smaller capacity runs. Cooker capacity is doubled* with this unit alone, because canner handles jumbled cans in double layers.

For complete Dudley system, Dudley basket dumps, spreading table and elevators are available.

*ON THE BASIS OF RATED CAPACITIES AND PERFORMANCE.

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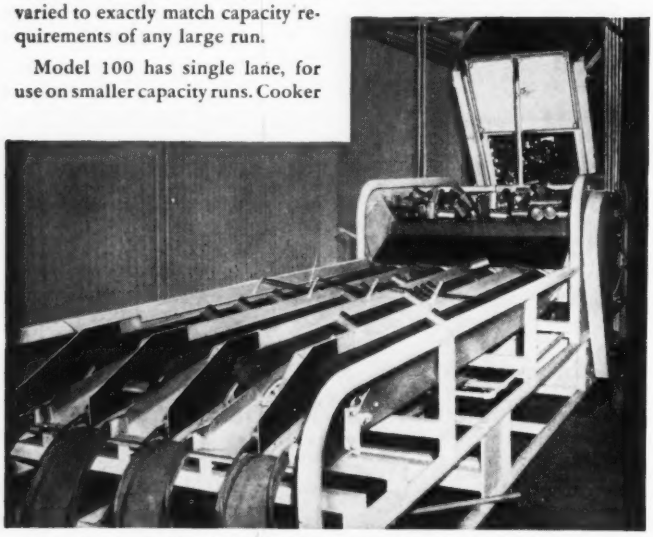

Photo Showing Dudley Model 400 Can Unscrambler with Dudley Basket Dumper

DUDLEY *Machinery Corporation*

Mountain View, California

and thawing, the pulp can be used in the same manner as conventional frozen apple sauce.

In the process, apples are peeled, cored and sliced, then dipped (1½-2 min.) in a bath consisting of 1 percent NaCl, 0.3-0.4 percent ascorbic acid and 300 ppm. SO_2. Slices are drained, then frozen on trays covered with waxed paper. They may be pulped immediately, deaerated and stored, or packed in 30-lb. tins and held in frozen storage.

Only fully ripe apples with a pronounced flavor should be used. Excellent products have been made with Jonathans or mixtures of Jonathan (¼-¾) and McIntosh, Wealthy, Red and Yellow Delicious (¼-¼).

Digest from "A New Type of Frozen Uncooked Apple Pulp," by G. and D. K. Johnson, Chemistry Section, Colorado Agricultural Experiment Station, Fort Collins, Colo.

BEVERAGES

Unpasteurized Bottled Beer

Sterile filling, preferred over pasteurization by some European brewers, requires sterile beer, sterile filling lines and machinery, and bottles that are sterile.

Sterile beer is readily produced by filtration, and it is probable that a less sharp filtration than is usually practiced will be adequate. Filter plates or disks which are too fine-pored remove flavor and foam producers, especially if adsorptive pulp is used. Double filtration using coarser plates, or centrifugation followed by filtration does little or no damage to beer flavor and foam quality, yet will deliver a product with adequate keeping qualities.

Sterile bottles are readily produced by flooding them with SO_2. Filling machines present difficulties since some of their parts may be damaged or distorted by steam. By flooding fillers with a solution of quaternary ammonium compound they can be effectively sterilized. This should be followed by thorough rinsing with sterile water since quaternaries can cause turbidity in beer.

A penetrating, sterilizing solution should have a concentration of about 3 milliequivalents quaternary per liter, higher than is normally used for ordinary disinfection. Strength of the solution can be determined by titrating it with an alkyl sulfonic acid solution, previously standardized against a quaternary of known molecular weight using bromphenol blue as an indicator.

Digest from, "Stable Beer in Bottles and Barrels" by Jean de Clerck, *Brauwelt*, 1161-64, Dec. 20, 1951.

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PILLOW BLOCK

EVEN AT LOW SPEEDS
THIS SEAL *PERFORMS!*

It's the famous Dodge metallic-backed neoprene seal that has proved itself in thousands of installations. It stays put. It can't blow. It keeps lubricant in—dust and dirt out—even at low speeds.

The SC Ball Bearing Pillow Block for small shafts and moderate loads, is a precision-built unit—a member of the famous Dodge 30,000-hour line. Modern styling . . . rugged one-piece semi-steel housing . . . long inner race . . . radial and thrust load capacity . . . fully self-aligning. Available from distributors' stocks in shaft sizes from $\frac{3}{4}$" to $2\frac{7}{16}$". Write for special bulletin giving complete specifications.

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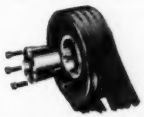
CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new cost-saving methods. Look for his name under "Power Transmission Equipment" in your classified phone book.



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Your needs- OUR SPECIALTY

One of 4 Fermentors, 12'0" x 22'7" high tangent. 10% Stainless Clad, type 304 Stainless . . . manhole body and connections type 304 Stainless. Each fermentor equipped with coils of 3" O.D. x 14 ft. tubing . . . type 304 Stainless. Tested to 80# Hydrostatic . . . produced in accordance with case 896 of the A.S.M.E. Code.

CORRECT DESIGN, RIGHT MATERIALS...

. . . yes, DOWNINGTOWN's experience and research in the fabrication of various grades of Carbon Steel, Stainless Steels, Nickel-Clad, Stainless-Clad, Monel-Clad, Cupro-Nickel, Aluminum, etc., may be of help to you. We are equipped with the most modern facilities to handle complete jobs, within our limitations, in the correct alloys and methods of fabrication required to assure maximum operating efficiency.

DOWNINGTOWN also maintains a Heat Transfer Division under the direction and supervision of men thoroughly trained and experienced in this field. Our Engineering Consultation is at your service to aid you in preparation of plans and specifications for definite jobs.

Useful literature sent upon request on your business letterhead. Remember: "Your needs are our Specialty!"

DOWNINGTOWN IRON WORKS, INC.
DOWNINGTOWN, PA.
STEEL & ALLOY PLATE FABRICATION
HEAT EXCHANGERS

NEW YORK OFFICE
30 CHURCH STREET

Beef On-the-Rail

(*Continued from page 91*)

leg from the inclined rail onto the main conveyor, from which the other leg is suspended.

A stopper finger automatically projects to the one trolley, while a conveyor-chain finger moves the other trolley along. This spreads the carcass to facilitate the next operations on the third rail. Microswitches on the rail release the stopper finger when the set carcass spread is reached.

5—Hide-Opener and Rimmer

Now, with both legs level at the start of the third rail, the belly-side hide is ripped open and rimmed. These operations follow butting, formerly performed by workmen on carcasses lying on the floor (skinning bed).

6—Lift for Workers

The belly-side hide is opened from a 3x10-ft., pneumatically operated elevating platform. By operating a lever, this platform is easily raised or lowered to permit two butchers to maintain comfortable, upright positions while slitting open hides of varying size carcasses with knives. Maximum elevation of this platform is 1 ft. On each side of this platform are metal boxes containing running hot water for sterilizing the knives.

As the carcasses move slowly along, these workers also perform the flanking operation (cutting the hide loose along the belly incision).

7—Special Skinning Knives

The rail makes another hairpin turn. Here, working on a stationary platform 6 ft. above the floor and along the fourth rail, butchers use specially designed, electrically operated skinning knives for rimming and clearing the rosette.

An important advantage of these knives is that they do not tend to damage the hides. With the knives properly held, it is almost impossible to cut the hides. Reason: Points of the saw-toothed blades are blunt—cutting is done only by the edges of the teeth.

The knives have definitely speeded operations. And experienced skinners prefer them to conventional knives.

Five alterations have been made on the fifth rail, on which rumping (removing hide from hind quarters), tail-pulling, cutting the aitch bone, hide-pulling, and sawing the brisket bone are carried out.

Don't confuse

FOAMGLAS®

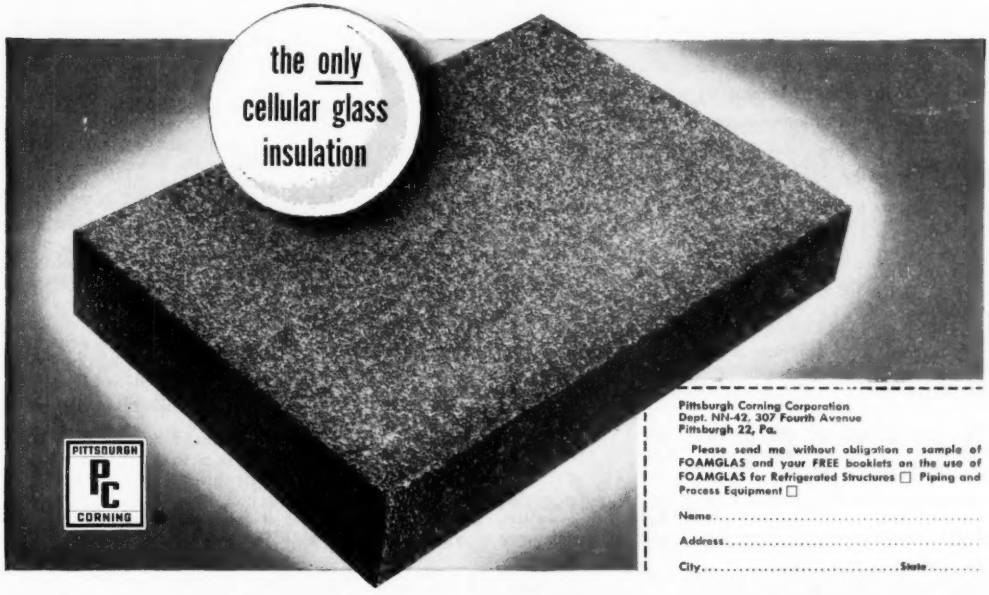
with any other insulation...

BECAUSE it is the only material of its kind. FOAMGLAS consists entirely of minute glass bubbles, full of still air, thereby giving exceptional insulating efficiency, plus durability.

BECAUSE it has exceptionally high resistance to moisture, vapor, and fumes, chemicals and other elements that cause insulating materials to fail, FOAMGLAS gives exceptionally long service.

BECAUSE it is adaptable. 1. It's especially helpful in maintaining low temperatures. 2. It's light in weight for use on roofs and ceilings. 3. It's strong, rigid, will support its own weight in walls. 4. It has high compressive strength for use under floors, sidewalks. It comes in special shapes and in standard sizes for piping and process equipment.

BECAUSE it is not a fiber, wool, board, blanket or batt. FOAMGLAS is made of a special kind of glass, powdered, mixed, heat-treated, slow cooled. These are some of the main reasons why so many people who know insulation prefer FOAMGLAS.



Pittsburgh Corning Corporation
Dept. NN-42, 307 Fourth Avenue
Pittsburgh 22, Pa.

Please send me without obligation a sample of FOAMGLAS and your FREE booklets on the use of FOAMGLAS for Refrigerated Structures ☐ Piping and Process Equipment ☐

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8—Rumping Simplified

The rumping is accomplished with the aid of power-driven skinning knives. Work is from a raised platform, simplifying operations by bringing the carcasses within easy reach of the butchers.

9—Pneumatic Aitch-Bone Shear

Cutting of the aitch bone is with a pneumatic shear rather than a conventional saw. For easy control of lifting and manipulating, the suspended shear is swung in balance with the aid of a counterweight. Not only does the shear make the aitch-bone cutting task easier, but it also improves carcass appearance.

10—Mechanical Tail-Puller

A vertical, pneumatically operated cylinder and flexible connector aid the worker in the tail-pulling and skinning tasks. Tail-pulling, formerly an arduous job requiring a strong knee and muscles, is now a simple mechanical operation done quicker.

The point of the tail is skinned and the brush is partly pulled down. Tip of the tail is then firmly held by means of a suspended, saw-toothed hand-clamp, and the brush is half-hitched onto a T-bar on top of the puller-piston shaft. A foot-operated switch actuates the piston that pulls the shaft and brush to platform level, thus stripping the skin from the tail.

Another foot-operated switch returns the piston shaft to its normal position. Finally, the tail is cut.

11—Can-Pak Hide-Puller

Heart of the on-the-rail beef-dressing system is the company designed mechanical hide-pulling machine. This intricate device accomplishes in only a few seconds the back-breaking task previously performed by floor men. It also removes certain portions of the hide that are difficult to get at with a knife.

According to W. R. Carroll, general superintendent of the Toronto plant, the Can-Pak puller improves hide quality. The "fell" is left on the carcass, and the hide is free from cuts and corduroys.

All functions of the hide puller are controlled by a worker operating eight pneumatic valves within easy reach.

The hide puller rolls on tracks so that it follows each moving carcass until the operation is completed. It then returns to its original position ready for the next animal.

Height adjustments are automatically made to suit the size of each

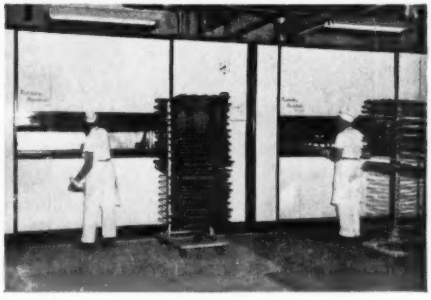
Three Outstanding *GAS* COOKING FACTS

Volume Food Preparation in Specialized Cafeterias at Endicott-Johnson Corporation

See the A. G. A. Combined Exhibit at the National Restaurant Exposition of the National Restaurant Association at the Navy Pier, Chicago, May 5-9

FACT 1

SPEED AND VARIETY IN FOOD SERVICE. With a minimum of Modern Gas Cooking and Baking Equipment, over 800,000 meals a year are served to employees of Endicott-Johnson—meals ranging from short-order, to lunches and dinners. To meet the volume demands imposed by shifts, gas fuel demonstrates its marvelous flexibility in these cafeterias located at Endicott, Johnson City, and Binghamton, New York.



FACT 2

CENTRALIZED BAKING FOR SIX CAFETERIAS, as well as meat and poultry roasting, for 19,000 employees, demonstrate the versatility of Modern Gas Ovens which do this double duty in the Johnson City cafeteria. Two Middleby-Marshall 24 tray Gas ovens bake all the bread, cakes and pies for the 6 cafeterias, and serve for volume meat cookery at banquets.

FACT 3

ECONOMY IN VOLUME MEAT COOKERY. Slow, even GAS roasting at 350° F in these baking ovens provides the maximum number of servings per pound of uncooked meats.

Modern Gas Cooking and Baking Equipment at Endicott-Johnson Corporation, Johnson City, New York provides maximum flexibility for fast food preparation in volume.

Modern GAS Cooking and Baking Equipment is versatile—provides food for short-period service for large groups, or for a continuous flow of patrons through a dining room.

Modern Gas Cooking and Baking Equipment is clean, fast, efficient, and economical to operate. Chefs and bakers like the precise temperature control Gas gives them.

When you modernize or enlarge your kitchens, talk to your Gas Company Representative to get the GAS COOKING FACTS.

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AMERICAN GAS ASSOCIATION

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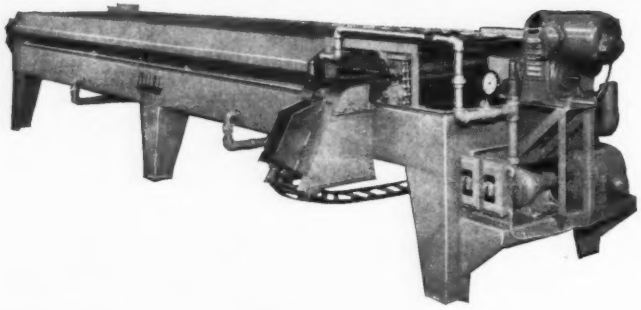
Proven In Operation!

The CRCO SPINNER-COOLER



It Saves Space . . .

Requires less than 50% compared to conventional types of spinner coolers.

It Saves Labor . . .

Continuous operation without attendant as compared to cooling in retorts or canals.

It Saves Time . . .

More efficient heat transfer than conventional models. 25% less time required in cooler.

It Saves Maintenance . .

Simplified construction. No belts to cause difficulties. Easy access to all parts.

It Saves Quality . . .

Positive and uniform temperatures obtained through variable controlled timing device.

It Saves Injury . . .

Gentle handling of cans throughout avoids injury.

Four models to handle varying capacities and sizes up to and including No. 10's.

See your CRCO representative or write for details and prices.

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CHISHOLM-RYDER CO. INC.

Niagara Falls, New York

FOR THE FOOD PROCESSOR

Chisholm-Ryder Company of Pennsylvania — AN AFFILIATE

Ayars Machine Company — A SUBSIDIARY

101

carcass. Raising or lowering of the machine are controlled by an air motor, operating through a system of gears and chains.

When the hide-puller is in position, a valve is depressed and a pulling arm (horizontal cylinder) travels out along each side of the carcass. Attached to each arm is a hide gripper. These grippers come into position open, and they are secured to the hide by the operator.

As the pulling rams retract, a cigar-shaped, pneumatically operated stabilizer (3 in. dia. and 2½ ft. long) supports each side of the carcass, thus preventing the carcass from pulling sideways. At the same time (during the retraction of the pulling arms), a pneumatically controlled back-support cylinder (12x18 in.) forces the carcass forward to assist in pulling the hide.

Following the hide-pulling, grippers as well as pulling and radial-arm cylinders are automatically released, and the machine returns to its original position—for the next carcass.

12—Brisket Cutter

Also adopted was a special pneumatic reciprocating saw for cutting the brisket bone. This saw is fitted with a tailored blade and a special top guard to push the paunch away from the blade. A live-steam sterilizing attachment is incorporated for cleaning the blade after sawing each bone.

By using this power saw, it is now possible to cut the briskets in an upright position while carcasses are suspended from the rail.

13—Automatic Scale

Finally, there was invention of a rail scale for weighing two sides of beef at a time. From washers, the sides of beef pass over the new scale rail. A section of it dips so that both sides of a carcass can be weighed together. Oncoming rollers displace the sides onto the scale, and the operation repeats.

Uniform-size travelers are employed so that fingers on the conveyor chain will catch the rollers and then slip by them as they slide into the curved, dipped section of the rail. Weight and grade are marked on tags that are attached to each side of beef.

From the grader, the sides ride to the coolers and the end of the rail.

The Can-Pak machines and devices were constructed and installed in Canada by McLean Machinery Co., Winnipeg, Manitoba. In the U. S., The Globe Co., Chicago, is handling manufacture and installation.

End (Resume reading on page 92)

A ~~NEW~~ PERMANENT Source of CERTIFIED FOOD COLORS

A complete line of primary and secondary Food Colors.

Write us for Prices and Detailed Information.

U.S.P. Vitamins in bulk

Also available in carriers for easy, accurate and economical fortification of foods.

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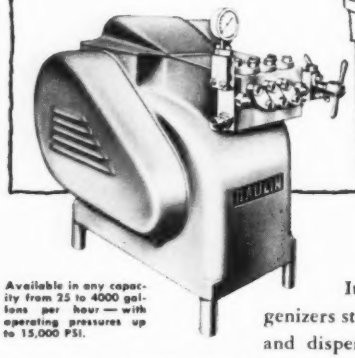
Shake Well Before Using!

She was only in charge of the larder
In need of a low cal'rie snack
But the dressing had parted
She couldn't get started
'Til she'd shaken an ache in her back



Available in any capacity from 25 to 4000 gallons per hour — with operating pressures up to 15,000 PSI.

It's a shame, too, because Gaulin Homogenizers stop separation in all kinds of emulsions and dispersions. If this one had been Gaulin-Homogenized she'd be going back for more.

Gaulin Industrial Homogenizers make emulsions and dispersions stable and perfectly uniform. Better looking and better tasting. And make them CONTINUOUSLY, MORE ECONOMICALLY, too.

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Ideal for experimental purposes, operation or process up to 25 gallons per hour capacity. Handles quantities as small as one pint. Available on low rental basis.

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Stator is jacketed for cooling or heating. Gap setting adjustable for .001" to .045". Only 45 seconds cleanup required in changing colors. 12" head room. 12 x 17" floor area.

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Model L-160, 142 inch wheelbase, insulated van body, 14,000 lbs. GVW.

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MOVING TABLE TOP OF STAINLESS STEEL
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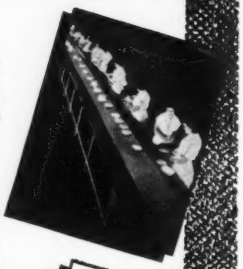
Here's a way to modernize food handling operations. Sandvik's standard work table units carry your product on a flat, endless band of stainless or carbon steel. Units can be adapted to virtually any application.



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EASY TO KEEP CLEAN—Live steam or boiling water can be applied directly.

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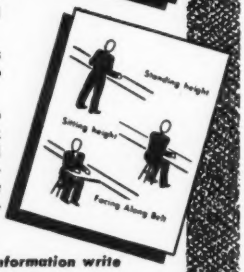
LONG SERVICE LIFE—Sandvik steel belt has inherent high strength and resistance to time and wear.

ENGINEERED TO FIT APPLICATION—Lengths to meet any center distance. Standard work table widths are 20" and 12" but special widths are also available. Correct working height can be arranged despite special floor conditions. Special, custom-built units also available. SS-59



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Manufacturers Of Steel-Belt Conveyors
For Over 30 Years

SANDVIK STEEL BELT CONVEYORS

New BLS Price Index

—Continued from page 129

29.1 percent of the processed foods total. Dairy products are given 21.9 percent of the foods total. Cereal and baking products ran third—17.6.

Sugar and confectionery is the only other group having a weight of more than 10 percent—accounting for 10.8 percent. The remaining groups rank as follows: Fats and oils, 6.8 percent; canned and frozen fruits and vegetables, 5.5 percent; other foods (jams, pickles, etc.), 5.3 percent; and packaged beverage materials, 3.0 percent.

In total, commodity coverage of the processed foods group has been expanded from 111 items in the old index to 138 in the new. However, the number of commodities in the cereals and baking group was cut from 27 to 18.

Biggest gain in commodity coverage occurred in the canned and frozen fruits and vegetables sub-group. The number in this sub-group now totals 27, whereas in the old index it was only 14. Coverage was expanded in the fats and oils group also—from 9 in the former index to 19 in the new. The meats, poultry and fish sub-group had previously been revised, so the number of items in this important group remained the same—41.

The new base period (100 percent) is the average of the three years 1947, 1948, 1949. The old base was 1926. For index computation, the usual practice is to select a normal time period for the base. But during the postwar years there hasn't been any normal period. In using the base 1947, 1948, 1949, BLS is merely going along with the U. S. Division of Statistical Standards, which has selected this period as base of all federal index numbers.

Starting with the January, 1952, index, prices used in the calculations will be those of one day in the month —in most cases the Tuesday of the week containing the 15th day of the month. Before January, 1952, prices used in index calculations were the simple averages of the four or five weeks in each month. This meant calculating averages for several hundred items.

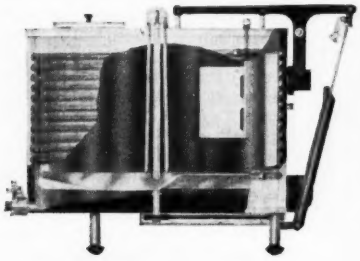
■ **Now time is saved by BLS—and thus the figures should be getting to users as much as 10 days earlier.**

Remember, too, that with fewer calculations the taxpayers save money.

BLS plans to publish weekly price indexes of processed foods. But these indexes are only to indicate trends in the monthly index. Thus, the weekly indexes will no longer carry historical meaning in themselves.

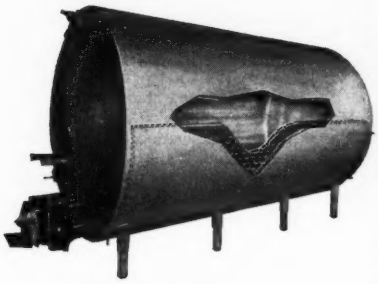
End (Resume reading on page 131)

FOR *Better* PERFORMANCE
CHECK THE ADVANTAGES PFAUDLER OFFERS



HEATING AND MIXING **Pfaudler Pressure Process "Lo-Vats"**

For products requiring efficient heating, holding, cooling or mixing, check these new Pfaudler stainless steel Pressure Process "Lo-Vats!" These insulated units are designed with a new type of spiral jacket (patent pending), tested at 250 psi. and include a manifold with multiple jets for heating with steam or hot water. May also be used for cooling with chilled water. Also with ammonia or Freon but not alternately with steam. Equipped with sweep-type demountable agitator powered by bottom drive. Capacities 100, 200 and 300 gallons. Vats of similar design also available in 500, 800 and 1000 gallons.



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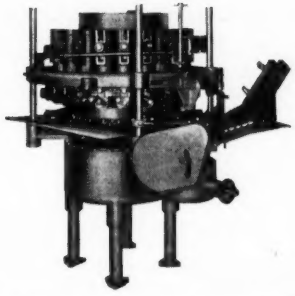
Most cooling and storage requirements can be met with Pfaudler's three types of sanitary Refrigerated Storage Tanks.

(1) Walled Cooled Type (Illustrated)—utilizes part of inner tank surface as cooling section. Efficient, compact, sanitary and easy to clean. Utilizes standard refrigerants.

(2) Spray Jacketed Type—coolant is sprayed under pressure over entire exterior surface of tank liner from spray pipe at top of tank jacket. Spray pipe easily removable for cleaning.

(3) Immersed Coil Type—can be installed in old or new tanks. Direct expansion stainless steel coil is located directly in front of tank agitator for maximum heat transfer. All tanks meet strictest Board of Health Sanitary Codes. Capacities to meet your requirements.



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The labor-saving, sanitary features of Pfaudler Piston Fillers provide maximum speed and filling efficiency at the lowest possible cost. For fast, easy cleaning, both the pistons and the self-compensating cut-off valves can be readily removed by hand. Only Pfaudler fillers have this money-saving, time-saving feature. The Pfaudler "no-can-no-fill" feature assures positive protection against spillage and waste. The same filler can be used for tin cans and glass jars. Capacities range from 100 to 600 containers per minute. Four models available with 6, 7, 14, or 21 stations.

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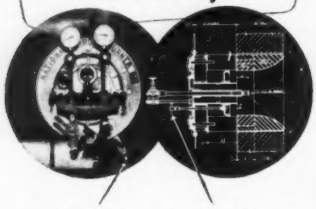

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Another "dual advantage" of NATIONAL AIROIL Universal Registers is that they are equipped for dual fuel firing of gas and oil.

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Questions & Answers

THIS MONTH'S PROBLEM

Question — We seek to manufacture a soft ice cream, but are not clear on the steps. Would you please supply us with a formula and notes on the processing phases?

Answer to February Problem

The Question Was — Some fruit juices, when concentrated under vacuum, are not as sensitive to heat as others. For example, orange and pineapple juices must be concentrated under 75 deg. F., while grape juice can be handled at 140 deg. F. without adversely affecting its flavor. Therefore, in designing a low-temperature, high-vacuum evaporator, what would be the relationship between temperature of a juice in the evaporator and the original cost of the equipment? Also, what would be the relationship between temperature of a juice in the evaporator and operating cost?

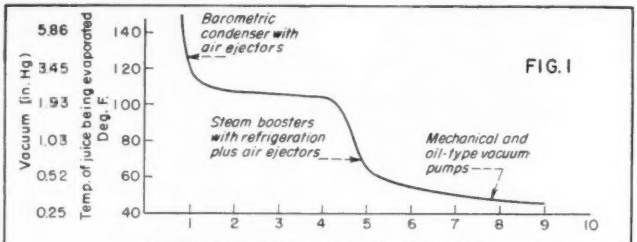
Answer—Assuming that equivalent heat-transfer rates and metals of construction are involved, then the initial cost of vacuum equipment for low-temperature evaporation, or even freeze-drying, depends upon the temperatures employed (see Fig. 1).

Where watertype barometric condensers are used alone as water-vapor pumps, the initial cost is relatively low. In this case, of course, small steam ejectors must be employed to pump out the non-condensables. This equipment operates best in the 100-150-deg. F. range (temperature of juice being evaporated).

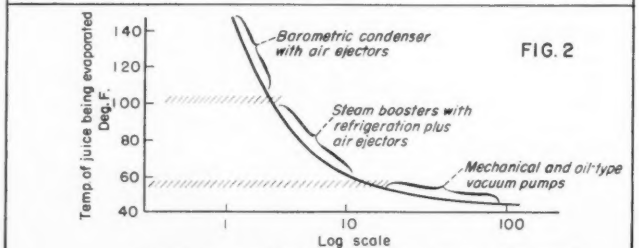
As the temperature of the juice is lowered to 100 deg. F., barometric condensers cannot pump the vapor economically. Consequently, steam boosters or refrigerated coils must be used to remove the vapor. The cost per pound of water vapor pumped increases with the added boosters or refrigeration.

The number of steam boosters required to concentrate juices at a still lower temperature range—below 40 deg. F.—often increases to an inoperable amount. What's more, refrigeration cannot be employed since the coils freeze. Mechanical pumps can best be used to remove water-vapor in this low temperature range. But here again, the initial cost is higher because the rotary and oil-type vacuum pumps are, at best, inefficient.

The relationship between the operating temperature of evaporation of the juice in the concentrator and operating cost follows approximately the curve in Fig. 2. For example, a liquid evaporated at less than 0.25 in. Hg vacuum (using a mechanical type vacuum pump) might cost 25 times as much to operate as when the same liquid is evaporated at, say,



Approximate relationship between initial cost of commercial vacuum systems per lb. of water evaporated



Approximate relationship between operating costs of commercial vacuum systems per lb. of water evaporated.

1.5 in. Hg vacuum—using the barometric condenser alone. However, in the middle vacuum range (0.75 in. Hg) and using boosters or refrigeration, the operating costs would be only 4 times the 1.5 in. Hg.

Problem With "Stuck" Wines

Question—What causes wines to stick—fermentation stopped and fermentable sugar still present. And what can be done about it?

Answer—This condition is caused by fermenting temperatures that are too high or too low, by the presence of excessive amounts of sugar in the wine, or by acetic-acid bacteria infections.

Unless sulfur dioxide has been used, stuck wines often spoil rapidly during storage. High temperatures that are often responsible for sticking favor the growth of lactic-acid and other spoilage organisms.

Immediate measures must be taken to re-ferment stuck wines, otherwise spoilage will occur. Treatment varies to some extent with the cause of sticking. In any event, attempts should first be made to invigorate the yeast by aeration. Sometimes the addition of small amounts of urea or ammonium phosphate will help.

Some wineries reactivate stuck wines by pumping a portion into another fermenter and innoculating the wine with actively growing yeast. As fermentation proceeds vigorously, more and more of the stuck wine is pumped into the fermenter.

If sticking is caused by high temperatures or excessive amounts of sugar, introduce small amounts of the stuck wine into vats where the must (crushed grapes) is undergoing normal fermentation. On the other hand, if sticking is due to too much sugar, then dilute the wine with must containing a low sugar content.

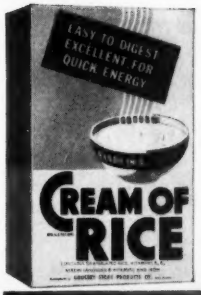
How Would *You* Do It?

Readers are invited to submit to FOOD ENGINEERING answers to questions in this department, especially to "This Month's Problem." Selected answers will be published, with credit (unless you specify otherwise). We pay space rates.

What Is *Your* Problem?

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.



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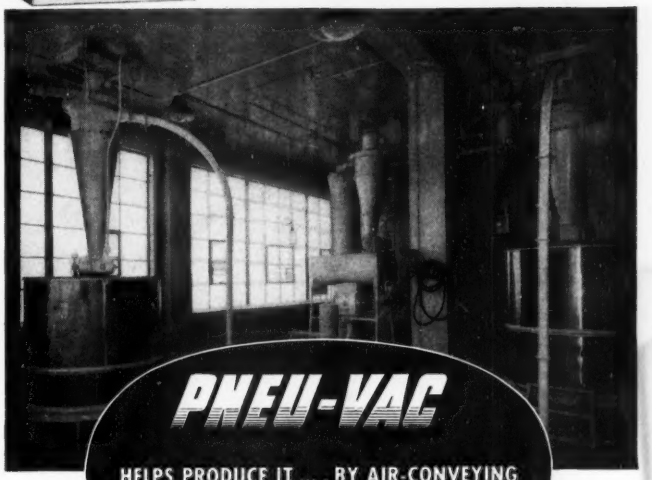

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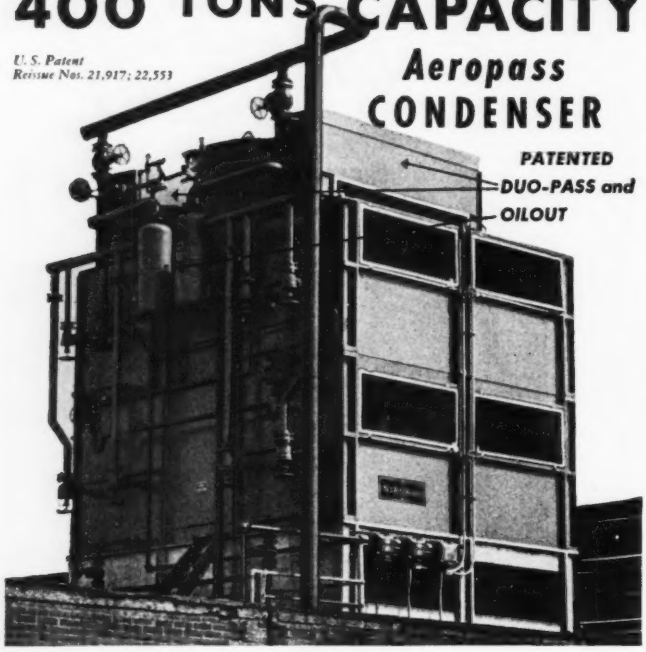

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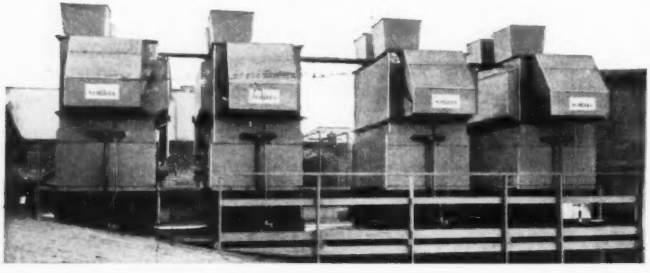

Fruit Floating in Preserves

Question—Our problem is making strawberry preserves with the fruit uniformly distributed throughout the jar rather than floating to the surface of the product. We are also trying to put out a product with the right set—a proper consistency, not too tight in the jar. Can you furnish us with information on how to keep the berries from rising in the preserves? And how to obtain the proper set? Also, at what temperature should the preserves be filled into jars?

Answer—The difficulty that you are having with berries rising or floating during processing can be corrected by employing the proper temperature range and cooking time. It is difficult to be more specific at this point, since you have not mentioned whether the open-kettle or vacuum-pan method is employed. In either case, however, the berries must be in continuous movement during the entire cooking and cooling periods.

Try making the following test batch to see if it points the way to improvement in your product: In a steam-jacketed kettle, concentrate the strawberry juice and sugar to the proper soluble solids content (68-70 percent). Next, add the berries, check solids content, and, when correct, turn off the steam. Hold the fruit at 135-145 deg. F. about 2-4 min. for a 200-lb. batch (less time for smaller batches). Then heat the preserve to 175-180 deg. F. (sterilizing temperature) and fill into jars.

The trouble with cooking the berries, juice, and sugar at the same time is that prolonged heating may disintegrate the berries, causing them to drop to the bottom of the jars and then rise to the top. But when only the juice and sugar are concentrated and the berries are added after the cook, then the syrup still penetrates into the berries which, in addition, are not exposed to high temperatures over a long period. And the berries should be uniformly distributed throughout the product.

The right preserve set will be influenced by the cooking procedure employed as well as the amount of pectin added prior to terminating the cook. Usually, 2-5 lb. of pectin are required to obtain a satisfactory set or consistency in a 150-lb. batch of preserves.

Make the following test batches to determine the correct amount of pectin to use for strawberry preserves: Cook three batches of preserves. Add 2 lb. of pectin to the first batch, 4 lb. to the second, and 6 lb. to the third. Fill into jars at 175-180 deg. F. Jars

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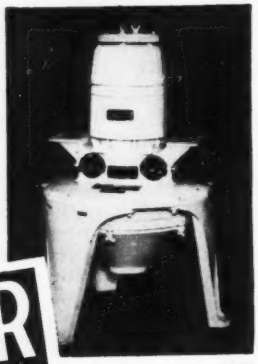

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should be labeled to identify the batches. Cool at room temperature for 72 hr., and then examine each batch to determine which one has the consistency you desire. When you have determined the proper amount of pectin to employ, use this amount for future batches.

Of course you must bear in mind that you'll get different consistencies in preserves due to variations in the amount of pectin in the many varieties of strawberries. And for this reason, it would be wise to run test batches on the various varieties received by changing the amount of pectin used per batch.

We are advised that 175-180 deg. F. is ideal for filling preserves into jars. And to fill at the proper temperature, it would be advisable to install an indicating thermometer in the hopper of the filling machine.

Getting the proper "roll" in the jar (correct consistency) and uniform distribution of berries boils down to: (1) Employing the right processing procedure, (2) adding the right amount of pectin per batch, and (3) filling preserves into jars at the proper temperature.

Shelf-Life of French Dressing

Question — We are considering commercial production of French dressings using soya, corn, and cottonseed oils. What is the shelf-life of a French dressing made with 100 percent soya oil, as compared with one containing the same amount of corn or cottonseed oil?

Answer — Since World War II, there have been notable improvements in refining soya oil, particularly from the standpoint of prolonging its keeping qualities. However, when soya oil is used in French dressing, shelf-life is only 2-3 months. After this time, organoleptic tests reveal a reverted flavor (grassy, haylike, and beany flavors that increase in intensity and give rise to fishy and painty odors in badly reverted oil). Such flavor changes, however, occur prior to the onset of true rancidity.

Corn and cottonseed oils hold up much longer than soya oil. And, when the soya oil in the dressing is replaced with these oils, shelf-life is materially extended. Dressings containing 100 percent corn, cottonseed, or a blend of both oils, usually have a 5 to 6-weeks' shelf-life.

And by substituting part of the soya bean oil (say 50 percent) with corn or cottonseed oils, shelf-life of the dressing can be extended beyond the 2-3 months period to about 4 months.

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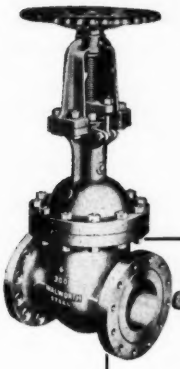

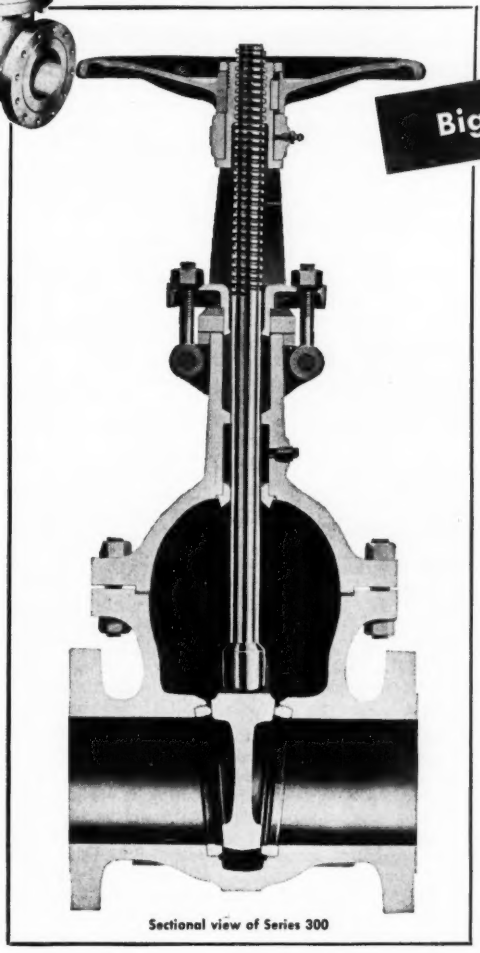

Sectional view of Series 300

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Latest in Food Series

THE CHEMISTRY AND TECHNOLOGY OF FOOD AND FOOD PRODUCTS, VOL. III. *Edited by Morris B. Jacobs. Published by Interscience Publishers, Inc., 250 Fifth Ave., New York 1, 1951. 1109 pages; 6¾ x 10 in., cloth. Price $15.*

This second edition of Volume III (the first was published in 1944) is a completely revised and augmented work. The 39 collaborators and the editors have added many chapters—on instruments in the food plant, essential oils, the manufacture of chewing gum, and the use of enzymes in food production—to this already authoritative text on food chemistry and technology.

The book comprises Parts V and VI of the three volume series—respectively, the principal methods of preserving, and production methods.

Besides discussing the chemical aspects of foods, this volume offers many equipment flow-sheets, pictures, and diagrams, increasing its value for engineers and production men. Processing and handling methods are carefully evaluated, with advantages and disadvantages cited.

Mass-Producing Wines

TABLE WINES: THE TECHNOLOGY OF THEIR PRODUCTION IN CALIFORNIA. *By M. A. Amerine and M. A. Joslyn. Published by the University of California Press, Berkeley and Los Angeles, Calif., 1951. 397 pages; 6x9¼ in., cloth. Price $4.50.*

Production of table wines is the theme of this handbook, written to help producers, technicians, and chemists in the wine industry find ways to lower costs and improve quality of both fine and ordinary table wines.

Introductory chapters point out fields in which improvements are seen needed, summarize requirements of state and Federal regulations, and report economic trends. Winery equipment and processes are described, with special attention to sanitation.

Description of operations from harvesting to the making of new wine is followed by separate chapters containing the special requirements for making red, pink, and white wines, sweet table wines, and sparkling wines. The authors have included chapters on the theory of ageing, clarification procedures, organoleptic and chemical methods of wine analyzing, and bacterial and other diseases of wines and their prevention and control.

Basic and reference tables and a list of general references conclude the book.

Better Baked Goods

BAKING SCIENCE AND TECHNOLOGY, VOL. I AND II. *By E. J. Pyler in collaboration with the staff of the Siebel Institute of Technology. Published by Siebel Publishing Co., Chicago, 1952. 803 pages; 6¾ x 9¾ in.; cloth. Price $15.00 for set.*

Summarizing the scientific and technological aspects of baking, these volumes stress the "how" and "why" of what goes on in an oven.

Theoretical considerations of the basic sciences relating to baking are presented in Part I of Volume I, while descriptions of the various ingredients and materials used are detailed in Part II.

Volume II includes a section on baking technology—dough mixing, fermentation, rye-bread production (to list a few chapter subjects). Also considered are cake baking, bakery equipment, packaging, and sanitation. Excellent photos supplement the text.

An extensive bibliography of over 500 references rounds out this treatise.

Round-Up on F&DA

FEDERAL FOOD, DRUG, AND COSMETIC ACT 1949-1950. *By Vincent A. Kleinfeld and Charles Wesley Dunn. Published by Commerce Clearing House, Inc., 214 N. Michigan Ave., Chicago 1, 1951. 543 pages; 6¾x9¾ in.; cloth. Price $10.25.*

Here the editors have further brought up-to-date the information available in bound form regarding the F&DA and its amendments. Second in a series published by the Food Law Institute, this volume will be useful to administrative officials, researchers, suppliers, and attorneys associated with the food industry.

Essentially, it is divided into four sections. One contains, in digested form, all the heretofore published and so-called "unpublished" F&DA decisions, findings, and conclusions since the inception of the Act.

The second part presents "Statements of General Policy or Interpretation" for the years '49 and '50. These indicate the present attitude of the Administration on many contemporary questions.

Definitions and standards for foods are described fully in the third section. They are conveniently listed under the categorical code numbers used by the Federal Security Administrator.

The fourth major part of the book provides legal references on citations, court decisions, and regulations which may apply to any subsection of the law put into force in '49 and '50.

Government Publications

PRODUCTIVITY TRENDS IN THE CANNING AND PRESERVING INDUSTRIES, 1939 TO 1950. *Bureau of Labor Statistics, U. S. Department of Labor, January* 1952. Summarizes man-hours per unit of output.

PRODUCTIVITY TRENDS IN SELECTED INDUSTRIES—INDEXES THROUGH 1950. *Bureau of Labor Statistics, Bulletin* No. 1046. Price 45¢.

These recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered directly from the Bureau responsible for its issue.

NEW MANUAL ON PACKAGING MILITARY SUPPLIES. *Three parts*, $1.75. This is a continued document from the three military services, including: Army Publication TM 38-230, Navy Publication NAVEXOS P 938, and Air Force Publication AFM 71-1. The three parts are seen as a valuable guide to industrial packaging, even for those not interested in sales to the Government.

CONSUMERS' USE OF, AND OPINIONS ABOUT, CITRUS PRODUCTS. *Bureau of Agricultural Economics, Agriculture Information Bulletin* No. 50. *Price* 40¢. Reports survey made in winter of 1949-50.

BIBLIOGRAPHY ON THE MEASUREMENT OF GAS TEMPERATURE. *By Paul D. Freeze. National Bureau of Standards, Circular* 513. *Price* 15¢. Although collated for gas turbine and jet studies, includes references of value to food engineers.

ANNUAL REPORTS OF VARIOUS DEPARTMENTS AND AGENCIES, *Fiscal* 1951 (*Year ending June* 30, 1951). *First Annual Report of National Science Foundation, price* 20¢. Outlines beginning of comprehensive Government support of basic research. Other Bureau Chief annual reports also available at comparable prices.

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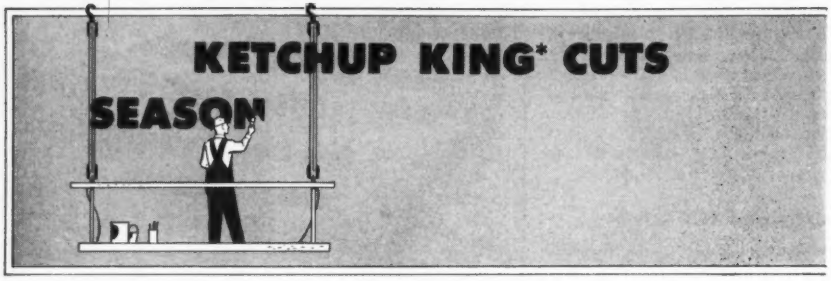

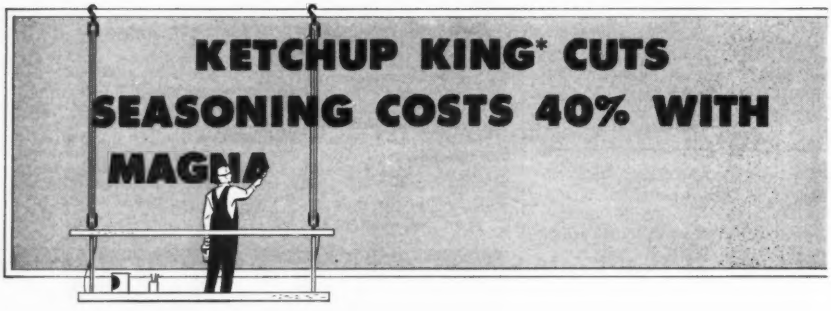

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KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

Better Bread Baking

An insight into what influences the keeping of qualities of bread, and what happens to a loaf during baking, was presented before the recent Society of Bakery Engineers' gathering in Chicago by C. W. Brabender of Pillsbury Mills, Inc., Minneapolis.

It was pointed out that three major factors affect bread shelf-life: 1. Starch gelatinization—the more complete, the better the keeping quality of the crumb; 2. increasing alpha amylase, which results in lower amylogram values—a softer dough forming which has delayed staling characteristics; and 3. adding shortening that delays staling—it being noted, however, that excess shortening inhibits starch gelatinization.

The sequence of steps that takes place during baking usually follows this pattern: At 95 deg F. the dough swells, with evolution of CO_2 and increasing enzyme activity; at 105 F., starch begins to gelatinize; and when the loaf reaches 120 F., yeast fermentation is retarded.

In the 125-140 F. range there is greater enzyme activity and increased pressure in the loaf due to CO_2 and water vapor; at 140 F., proteins coagulate and yeast fermentation stops; alcohol evaporates at 160 F.; enzyme activity ceases and maltose carmelizes at 175 F.; and starch stops gelatinizing at 195 F.

Steam forms at 212 F. and the crumb becomes saturated; light yellow dextrins form in crust from 212 to 250 F.; brown dextrins form between 250 and 285 F.; and ordinary sugars carmelize at 270 F.

Membranes Desalt Waters

A new, low-cost method for the demineralization of sea water has been announced. The process is based on the use of electrical energy in conjunction with recently developed synthetic membranes.

In addition to purifying sea water, the membranes appear feasible for purifying sugars, glycerine, and milk, plus recovering valuable chemicals and metals from waste streams.

Announcement of the process was made by Dr. E. R. Gilliland, president of Ionics, Inc., of Cambridge, Mass., manufacturer of the membranes. Energy consumption is calculated to run as low as 20 kw.-hr. per thousand gallons, or about 6c. per thousand gallons where electricity is 3 mils per kw.-hr.

The membranes are continuous films of synthetic plastic, usually 10 to 40 thousandths of an inch thick. Made largely of cheap coal-tar and petroleum chemicals, they are amenable to continuous production owing to their sheet-like character.

The apparatus has no moving parts and uses no heat or chemicals.

Stockpiling Baked Goods

In the not too distant future, more and more bakery operators will find their work a lot easier—for they will be able to schedule their output much more uniformly.

The worksaver method that shows promise of simplifying today's bakery production problems is freezing and storage of finished products. In this way, bakers can build-up stockpiles to draw upon when needed—weather, holidays, and other market conditions no longer affecting work schedules.

A number of bakeries have already adopted this plan, with resultant labor savings and reduction in "stales." Besides custard products and jelly rolls (the jelly weeps), almost all products can be handled in this manner.

Several tips on this type of operation include the facts that cake holds up better when rich in sugar, and icing should be applied after cold storage to prevent loss of shine.

Peroxide Protects Milk

Hydrogen-peroxide treated whole milk may be an inexpensive future answer to keeping the staple "on the shelf" indefinitely.

A new preservation method developed by E. B. Williams and J. A. Banghart at Colorado A&M uses this chemical along with a controlled heat application. to milk is added edible hydrogen peroxide—this chemical later going to form pure water.

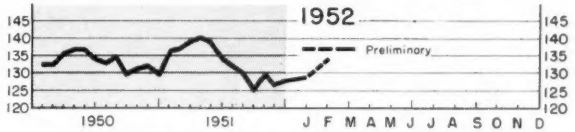
Standard homogenization precedes the canning and 30-min.-heat sterilization steps. The peroxide destroys many types of heat-resistant bacteria, with subsequent heating then requiring lower than normal temperatures.

Edible Non-Greasy Coatings

Food people are awaiting results of an evaluation being made of a flexible, non-greasy coating developed by the U. S. Department of Agriculture at its Southern Regional Research laboratory in New Orleans.

For a long time there has been a need in the food industry for an edible-fat coating material to replace paraffin and other non-fat coatings

FE OVERALL FOOD PRODUCTION INDEX



PRODUCTION UPS AND DOWNS IN BRANCHES

CHANGE \ BRANCH	BAKING	BUTTER	CANNING	CHEESE	CONFECTIONERY	EVAP. MILK	ICE CREAM	MALT BEVERAGES	MARGARINE	MEAT	SUGAR	WHEAT FLOUR
FROM SAME MONTH YEAR AGO	↓	↓	↓	↓	↑	↓	↑	↑	↑	↓	↓	↓
PERCENT CHANGE	-1	-10	-16	-5	+1	-14	+11	+6	+18	-3	-8	-4

(1939=100, Based on Industry Man-Hours, Adusted for Seasonal Variation)

LEGEND: ↑ Raising → Steady ↓ Falling

HOW TO
set up and maintain an effective plant sanitation program

This practical manual presents workable principles and methods of good plant sanitation which can result in more efficient operation, better workmanship, fewer accidents, and improved personnel relations. In simple language, and extensive outline style of treatment, it gives "how-to-do-it" material of value to all food processors, and particularly useful to the canning, freezing and dehydration industries. There is also much to help those concerned with the sanitary transportation, storage and distribution of both fresh and processed foods. Here are helpful illustrations, all the essential steps, equipment, applications, etc.—a wealth of information to enable you to establish an efficient, profitable sanitation program.

Just Published!

SANITATION For The FOOD-PRESERVATION INDUSTRIES

Prepared by The Association of Food Industry Sanitarians, Incorporated
In Cooperation with The National Canners Assoc.

284 pages, 118 illustrations, $5.00

From the start this book gives useful facts on organizing a sanitation program, including materials, procedures, and interpretative comments for the sanitarian, manager, superintendent and foreman. Equipment and techniques for plant inspection are clearly described. The book tells how to store food products, containers, machinery, etc.—explains the significance and control of animal and bird pests, insect pests and microorganisms—and discusses the methods of getting an ample supply of suitable water, handling and storing it for use in food plants.

The book tells how to

- store ingredients
- control rodent pests
- apply insecticides
- apply sanitizing solutions
- pipe sewage through a plant
- locate a food plant
- select proper detergents
- use liquid chlorine
- handle solid wastes
- dispose of and utilize waste, etc.

The factors to consider for the proper construction and maintenance of buildings and equipment are plainly outlined. You're told **how to** organize an effective cleaning program in a food plant to prevent contamination of perishable products—and how to provide the necessary sanitary, feeding, and even housing facilities for employees. Other helpful material, representing the experience of many practicing sanitarians, includes a discussion of chlorination techniques, a non-technical coverage of waste treatment and disposal, and a compilation of laboratory aids.

Let this "how-to-do-it" guidebook help you install and maintain an effective, money-saving food plant sanitation program—overcome a variety of everyday problems.

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Versatile Carolina Dairy

Located in Winston-Salem, this newest and largest unit in the Southern Dairies, Inc., chain was erected at a cost of over $1,500,000. The building contains 50,000 sq. ft. of floor space in its two stories. Besides the most modern processing equipment for milk and ice cream, the dairy houses cold-storage and hardening rooms, a battery of three paper bottling machines, quality control lab, and a school for training distributors. Southern Dairies, Inc., operates the plant.

now used. In general, a non-greasy fat is usually hard and brittle, while flexible fats are usually soft and oily.

SRRL has discovered a way of simply preparing the desired fat-derivative coating for use on cheese, dressed meats and poultry, ice-cream bars, and other food products.

The New Orleans researchers found that when monostearin (a monoglyceride prepared from glycerin and completely hydrogenated cottonseed oil or similar fat) is allowed to react with acetic anhydride, acetostearin results. The monostearin and acetic anhydride are heated together for about 1 hr. at about 230 deg. F. Acetostearin needs only to be washed with water and deodorized prior to use.

Various acetostearins having melting points ranging from 80 to 140 deg. F. can be produced. The melting point of any particular acetostearin depends on the grade of monostearin and the degree of reaction with acetic anhydride.

Most acetostearins are non-greasy and flexible below their melting points, and below room temperature. Most of them could be stretched more than 800 percent without breaking. Even the least flexible acetostearin product stretched six times as much as did paraffin wax and remained flexible throughout the tests at freezing temperatures.

Although no facts indicate that these fats are not edible, they are now being carefully evaluated by several laboratories before being recommended for use in foods.

Further Food-Dye Studies

Use of aromatic-amine type food dyes should be carefully assayed and in a broader light than in the past, according to testimony by Dr. R. L. Mayer given to the Delaney Committee.

A great number of compounds belonging to the same family as these dyes have been found to produce allergy sensitizations and even intestinal cancer. The individual food-dye members, said Dr. Mayer, have been proved perfectly harmless on both counts—when given to people who have not previously contracted an allergic sensitization or cancer.

But if a person already has an allergy contracted by exposure to one of the toxic members of the chemical groups, then he may be susceptible to a worsening of his condition through contact with some of the food dyes.

Meat in Mechanical Reefers

This spring mechanically-refrigerated railroad cars will be launched on regularly scheduled long-distance runs hauling meat. Arrangements have been made to put 25 units in service for John Morrell & Co., Ottumwa, Iowa.

The cars will operate between the Midwest and points in Florida. Frozen foods, notably citrus concentrates, are to be carried on the return trips.

Refrigeration units are completely

automatic, and may be set for any desired car temperature, with defrosting every 5 hr. Powered by gasoline, each mechanism is a self-contained package installed at one end of the car and occupying half the space required by ice bunkers. They consist of a gasoline engine, compressor, cooling coil, air circulating fan, and automatic controls.

Only 172 cars in the nation are so equipped today. But successful reports on their use from the Bellows Falls Cooperative Creamery (shipping milk) and a number of Florida citrus concentrators indicate satisfactory performances.

The Thermo King Railway Corp. makes the refrigeration systems to be fitted into newly-built cars furnished by the Mather Stock Car Co., Chicago. Maintenance will be handled by Thermo King. (For equipment description, see "Mechanical Units Heat or Chill Car," p. 146, Feb. '51 *Food Industries*.)

Freezers Elect Slate

Meeting in Chicago last month, The National Assn. of Frozen Food Packers elected these officers for the coming year:

C. L. Snavely of Consumers Packing Co., Lancaster, Pa., president; Mel Spiegl of Spiegl Farms, Salinas, Calif., first vice-president; and G. O. Bailey of Birds Eye-Snider Div. of General Foods Corp., N. Y., second vice-president.

Meat-Labor Accord

End of the CIO United Packinghouse Workers' series of walkouts and stoppages at Armour and Company plants was confirmed with acceptance by the Union of a 6c.-an-hour wage increase plus a number of contract benefits for the 30,000 employees.

Armour's offer of the 6c. increase was based on a rise in the Wage Stabilization Board cost-of-living index

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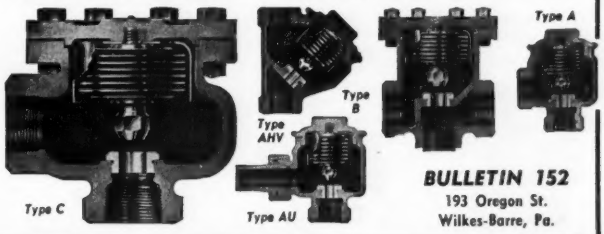

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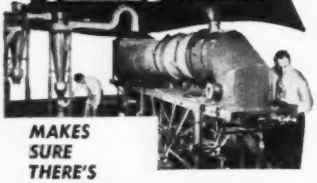

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during Jan. 15, 1951 to Nov. 15, 1951. The proposal came in December after the rival AFL Meat Cutters had settled on the wage benefit alone. CIO, however, refused to accept, claiming that the Aug. 11, 1951, reopening clause of its master contract with meat packers allowed negotiations on other issues in addition to that of a general wage increase.

Specifically, the new CIO agreement won two major concessions from Armour. First, the wage differential between men and women was considerably narrowed. Second, there was an adjustment in geographical and job inequalities for 1,600 classifications.

In December, Armour filed a $1,378,300 damage suit against the UPW, charging that its work stoppages were a violation of the union's contract. The suit, filed in U.S. District Court at Omaha, is expected to be withdrawn as a result of the agreement.

Fungal Enzymes in Baking

Use of tailored fungal enzymes in baking can upgrade processing and overall-product characteristics. And regulating the ratio of amylase and protease enzymes appears to be the most important factor.

The enzymes can be prepared practically free from protease, providing a source of amylase for the sponge going to the fermenting room. Thus, if a reaction with gluten is not desired, this enzyme formula would fit.

But from a practical standpoint, sufficient fungal enzymes containing a standardized ratio of amylase to protease should be added. The resulting dough should take less time to mix, has better oven spring, and develops a grain without danger of excess starch breakdown.

Fungal enzymes cannot replace conventional ways of developing softness retention in bread, but they will contribute through the formation of grain and texture. Mr. R. T. Bohn, Bohn Food Research, Inc., Scarsdale, N. Y., presented these findings before the recent meeting of the American Society of Bakery Engineers.

Review Tuna Tariffs

The U. S. tuna industry is seeking immediate government relief from the pressure of heavy imports of canned, frozen, and fresh tuna and bonito. And far-western state officials are adding their voices to the mounting demand for aid in the form of revised tariffs and quotas.

Imports of canned tuna are arriving in brine, thus benefiting from a tariff law "basket clause" that calls for a duty of only 12½ percent on the declared value. Oil-packed tuna (the kind U.S. canners pack) is well protected by a 45 percent figure.

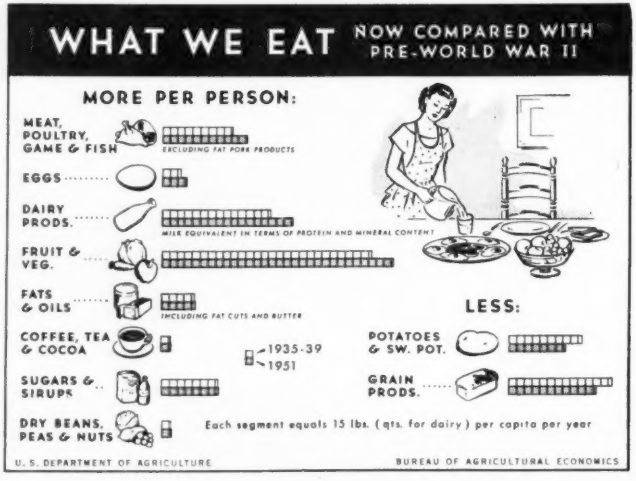
During 1951, tuna-in-brine imports jumped 25 times over the 1950 level—most of the influx being from Japan and Peru. Steep increases in fresh and frozen tuna imports were also registered.

Bakers Pick Officers

Officers elected for '52-'53 by The American Society of Bakery Engineers at its recent 28th annual meeting held in Chicago include:

Fred Weberpals of the H. C. Bohack Co., Brooklyn, N. Y., as presi-

(Turn to page 197)



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A year later, in 1898, a large Worthington System was installed for the Boston Packing and Provision Company.

But this was just the beginning. Since the turn of the century, Worthington constantly worked to build better and more efficient refrigeration equipment to meet the increasing needs of America's packers.

Today, in an industry that to a large extent built its progress on the advances in refrigeration, the Worthington name serves such giants as Armour, Swift, Wilson, Hormel, Morrell, Union Stock Yards and Transit Co., Miller and Hart.

Worthington will continue to serve the packers—and every other industry —with the most complete line of refrigeration machinery available. We want to be sure users of refrigeration equipment everywhere never forget *there's more worth in Worthington.* Worthington Pump and Machinery Corporation, Air Conditioning and Refrigeration Division, Harrison, N. J.

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dent; M. J. Swortfiguer of Kroger Baking Co., St. Louis, as first vice-president; L. P. Kenney of Red Star Yeast & Products Co., Milwaukee, as second v.-p.; and W. K. Swanson of Columbia Baking Co., Atlanta, third v.-p.

Field Facts

Supplies for '52 are expected to be sufficient to maintain domestic food consumption per person at least as high as in 1951. Substantial stocks of storable foods are available from last year's crops and output of most livestock products and winter crops is relatively large.

Meat should be in good supply, but the available types will differ from last year . . . Pork is on the decline, while lamb and beef will be on

(Turn page)

Hors d'Oeuvres

• A shift of Los Angeles housewives from canned to frozen foods is troubling Western copper producers—they can't get enough scrap shredded cans required to electrolytically salvage extremely valuable copper from waste run-off streams. Another reason for never underestimating the power of a woman.

• *Americans are priding themselves on hitting an all time high in 1951 for consumption of macaroni products. But we're still a long way from being the world champs—since Italians are averaging 65 lb. per year against our 7 lb.*

• Clothes are being woven in the Philippines from banana and pineapple fibers, using a special loom developed by U. S. technicians. Looks like our dear old friend Miss Chiquita Banana will be sporting a new Easter outfit.

• *Distinctive poultry flavor depends upon the stage of maturity of the bird's feathers, according to Charles Vantress, who won the Institute of American Poultry Industries' "chicken-of-tomorrow" contest. Nice to have confirmation of our theory on choosing the best-looking chickens.*

• New Hampshire businessmen are teasingly threatening to rename one of their towns "Vermont", so that its syrups may be labeled "made in (you-know-where)". Straighten this one out between yourselves, boys, but let's not blockade any of that fine "New England" syrup.

• *Economists are successfully using beer-sales figures as an index of local employment conditions. On this basis, our brewers may soon be in a position to eliminate a dozen or so government agencies now engaged in crystal-balling along these lines.*

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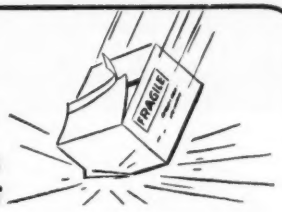

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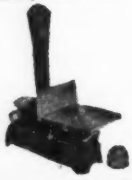
Another Detecto-Gram Scale for weighing your ingredients accurately. New Model #8800 brings to your heavy duty weighing jobs the mechanical accuracy previously found only in small scales. Capacity ¼ ounce to 60 lbs.



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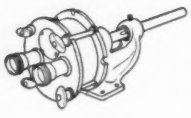

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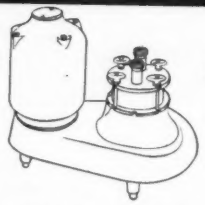
Fits your older Viking equipment bringing it up to date with the latest 3A approved sanitary pump. Solid dairy metal construction.



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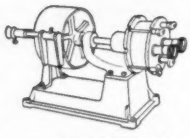

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Conventional drives, flat belt above and V-belt below, as well as gear, direct and up-right models, can be furnished with Sanitor pump.

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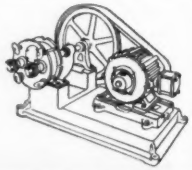


See Our Catalog In SWEETS

Viking PUMP COMPANY

Cedar Falls, Iowa

the increase . . . Veal, however, is very scarce . . . Canned poultry production has been down slightly during the past year, still above the '46-'50 average . . . U. S. Quartermaster Corps would like to see more offerings of poultry and eggs.

On-hand stocks of *frozen fish* are high—*shrimp*, *ocean perch*, and *whiting* leading in volume . . . Fresh and canned *fish* supplies are dropping, with *mackerel*, *halibut*, and *haddock* and *cod fillets* on the semi-scarce list.

Output of eggs and *poultry* set new records in '51, and current indications point to even larger supplies in '52 . . . Lightweight *turkeys* and *ducks* will be in very good supply.

Fats and *oils* are expected to be sufficiently large to maintain civilian consumption and the present high rate of military and export takings . . . Increases in *cottonseed oil* and *lard* are likely to more than compensate for the decline in *butter* and *soybean oil* . . . *Clove oil* will remain short, mainly due to increasing world demand.

Both fresh and processed *fruits* are expected to remain in good supply—oranges to be exceptionally plentiful . . . Cold-storage stocks of apples are a third below last year . . . Vegetable output and canning held at a steady rate in '51 and no change is expected this year.

Cuts Dough-Mixing Time

It is now stated that mixing time required for bread doughs, though reduced, is *not directly* proportional to the amount of proteolytic enzyme added. The exact time reductions may be seen from these figures—doubling the enzyme dosage each time:

Mixing Time, Percent (100 percent = no enzymes)	Enzyme Dosage
84	1 X
80	2 X
55	4 X
45	8 X
35	16 X

Don Coles, Purity Baking Corp., Chicago, revealed these figures in an address before a group of The American Society of Bakery Engineers recently convened for their 28th annual meeting in Chicago.

He also stated that even though increasing amounts of proteolytic enzymes give dough from the mixer a less mixed appearance, that coming from the molder looks the same.

List Corporate Earnings

Higher tax bites into incomes of food companies this past year are causing a more widespread downward drift in profits. In every case but one, sales of the firms listed below were

SHOW SOME SCRAP!!

This country was built on initiative, guts, and fight. Whether you call it "police action" or what, we're in a fight that calls for scrap, in more ways than one.

The boys in Korea are providing one kind of scrap. People in industry must contribute the other kind—scrap iron.

Last we heard, four furnaces in a big steel plant were shut down for lack of scrap. Steel is made half from pig iron, half from scrap.

Take a look around your plant and premises for old, idle, and useless metal in all shapes and forms—obsolete machines, valves, gears, and what not. And get it to a scrap dealer.

If anyone thinks this is asking too much, try telling it to the Marines!

—The Editors.

higher in '51 than '50, but only a few showed profit gains that were anywhere near being proportionate.

The table itemizes net sales and incomes for 10 companies recently reporting data on their 1951 balance sheets:

	Sales, Net in Millions		Profits, Net in Millions	
	1951	1950	1951	1950
American Chicle Co...	$38.4	$35.1	$4.16	$4.80
Armour and Company ..	2,215.2	1,859.8	16.03	19.04
Continental Baking Co..	170.2	155.2	4.62	5.67
General Baking Co..	114.2	106.8	2.62	3.17
Glidden Co...	228.5	187.0	8.31	8.56
Hunt Foods, Inc.	62.7	59.5	2.61	4.82
Jewel Tea Co., Inc.	209.2	188.7	3.58	4.31
McCormick & Co., Inc....	37.8	39.8	0.63	0.59
Ward Baking Co.	91.1	85.4	2.22	3.14
Wilson & Co..	823.6	708.8	4.75	4.34

Central Brewery Research

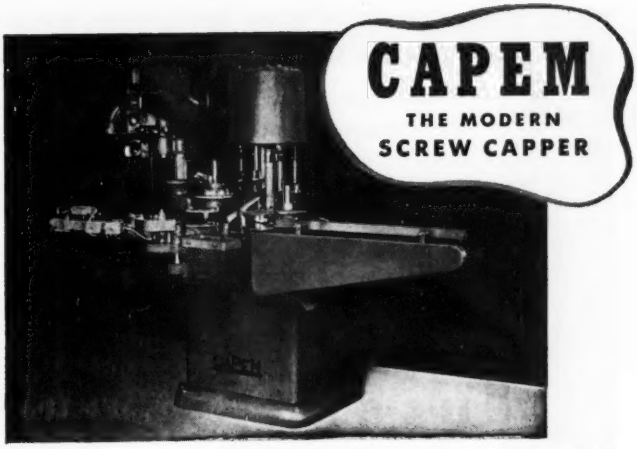
To consolidate and expand their technical efforts, brewers have now formed the Brewing Industries Research Institute. Dedicated to aid all companies in the field, the Institute is being sponsored by major organizations in the field.

President of the new body is Edward W. Huber, vice-president and master brewer of the Miller Brewing Co., Milwaukee.

Dyes From Citrus Waste

A series of citrus peel-derived yellow, orange, and red dyes has been developed by researchers at the Citrus Experiment Station, located at Lake Alfred, Fla.

Proved adaptable to the dyeing of woolens and silks, the new citrus by-product is reportedly made from hes-



- Applies any type of standard screw cap or cover at speeds of 2,000 to 10,000 per hour.
- Takes container from conveyor line, applies cap perfectly, and returns container to conveyor AUTOMATICALLY without intermediate handling.
- Handles bottles, jars, cans or jugs of any size or shape.
- Delivers a perfect, LEAKPROOF seal at low cost.
- Available in 1, 2, 4, 6 and 8 spindle models.

Write for prices and delivery.

CONSOLIDATED PACKAGING MACHINERY CORP.
BUFFALO 13, N.Y.

● IN FOOD PROCESSING

When You Use Low Temperature

USE CORK

The time to make sure of your insulation protection is before you build or expand. Get the facts on Cork insulation when they can do the most good. Cork is so efficient in insulating properties that its performance has long been the accepted standard for low temperature requirements. Its wide usage in the refrigeration industry is due to its proved record for more than 40 years. Mundet refrigeration engineers are experienced in all details of temperature control. Write to us now for recommendations and estimates . . . let us help you secure the most profitable use of low temperature. Mundet Cork Corporation, Insulation Division, 7101 Tonnelle Ave., North Bergen, N. J.

MUNDET
CORK INSULATION

For more information, use post card on last page.

Wisconsin packer speeds up vegetable processing

● Greatly increased output . . . less hand work . . . better product . . . more profitable operation . . . with fewer labor problems. Those were the results when this leading packer installed Cyclone Equalized Spiral Belts to carry mixed vegetables through automatic washing and quick freezing operations.

In *your* plant, too, there may be some operation that could be handled faster, better or more economically with the installation of a Cyclone Conveyor Belt. They are available in three styles —Spiral Woven, Flat Wire and Flex-Grid—one just right for your needs. Why not write Dept. H-42 for a free copy of our Catalog #4.

U·S·S CYCLONE
METAL CONVEYOR BELTS

CYCLONE FENCE DEPT.
AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL COMPANY
WAUKEGAN, ILLINOIS

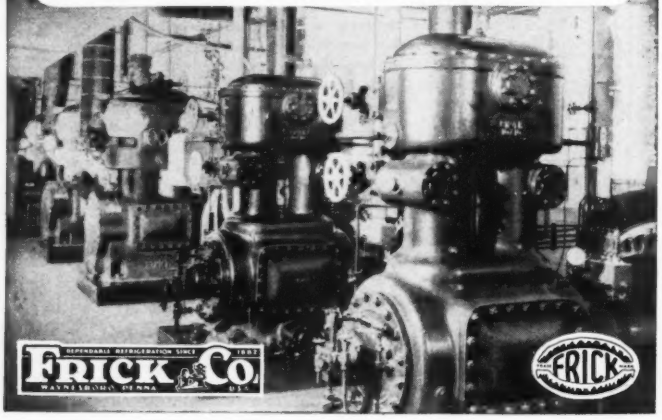
USS

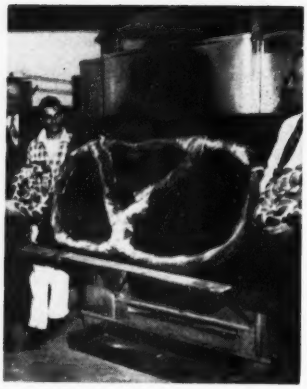
UNITED STATES STEEL

Snow Crop Marketers Install Frick Refrigeration

Snow Crop Marketers, a Division of Clinton Foods, Inc., and one of the largest packers of quick-frozen foods in the country, has in operation at Lewiston, Idaho, a battery of five large Frick compressors which produce temperatures as low as minus 40 degrees F. Installation by Lewis Refrigeration and Supply Co., Frick Sales-Representatives at Seattle.

Super-dependability and economy have made Frick refrigerating machines the favorite with quick-freezers, as well as in air conditioning, ice making, and other cooling systems. Ask the nearest Frick Branch or Distributor today for an estimate on the refrigerating equipment you need.





Super-Sized Pretzel

Weighing over 50 lb., this pretzel is said to be the largest ever made. It was prepared and baked by the Federal Pretzel Co., Philadelphia, for the National Pretzel Bakers Institute. Baking time was 2 hr.

periden and naringin—the bitter constituents of orange and grapefruit peel, respectively.

J. W. Kesterson and R. Hendrickson conducted the preliminary research at the Experiment Station.

F&DA Food Standards

Status of food standards of Food & Drug Administration in early March is reviewed below:

Court Decision

Ninth Circuit U. S. Court of Appeals held on Feb. 13 that the present Food, Drug & Cosmetic Act does not require manufacturers to grant permission to F&DA inspectors to enter and inspect their plants. This reversed a District Court decision in the Cardiff case (dried apple manufacture, Washington Dehydrated Food Co., Yakima, Wash.). F&DA is now taking the decision to the Supreme Court, where an answer is not likely for several months. The Circuit Court decision is not binding except in the seven Western States.

Policy Statement

Certain retail containers have been exempted from complete labeling by a statement of general policy appearing on page 1577 of the Feb. 21 *Federal Register*. This applies only to those packages filled from properly labeled bulk containers at the retail establishments under conditions specified by F&DA. (See p. 182 Jan. FE.)

This wrapper almost talks!

TYTON SUPER SEAL BREAD WRAPPERS

Here's a bread wrapper that's bound to flag the attention of self-service store customers. Marathon's Tyton Super Seal takes clear, undistorted printing in bright, vibrant colored inks. It "pops out" from the grocer's shelf . . . calls out to the housewife to take home your brand of bread.

Contact your Marathon salesman, or write: Marathon Corporation, Menasha, Wis.

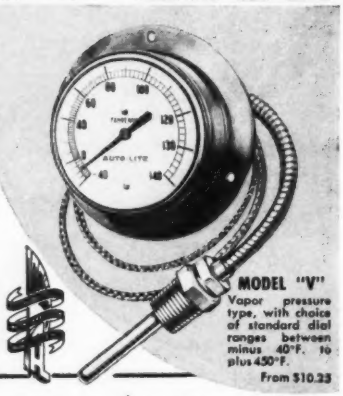
Marathon

packaging that sells food

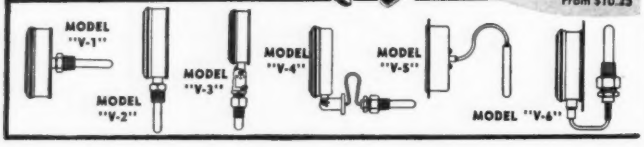
Depend on AUTO-LITE for TEMPERATURE INDICATION

Model "V" is one of many Auto-Lite dial thermometers made for industry. The outline drawings show how this temperature indicator can be adapted to meet specific needs through various standard mountings. Send for our new Catalog No. G-143-B of Auto-Lite dial indicating and recording thermometers.

THE ELECTRIC AUTO-LITE COMPANY
INSTRUMENT AND GAUGE DIVISION (Dept. D)
TOLEDO 1, OHIO
NEW YORK • CHICAGO • SARNIA, ONTARIO



MODEL "V"
Vapor pressure type, with choice of standard dial ranges between minus 40°F. to plus 450°F.
From $10.23



CARLOAD SPACE AVAILABLE

at HORSEHEADS Industrial Center

for in-transit storage east or west

Complete warehousing services • Served by 4 railroads, 30 truck lines • 1,500,000 square feet

Overnight distribution to area of 40 million persons between eastern seaboard and Mid-west

For details, write or wire

LEHIGH-HORSEHEADS WAREHOUSE CORP.

Horseheads, N. Y. or 98 Frelinghuysen Ave., Newark, N. J.

Future Hearings

1. *Salad dressing*, rehearing, standards of identity; "skim milk and milk products" proposed as optional ingredients. F&DA gathering data; no hearing date set.
2. *Process cheese food*, amendment, standard of identity; skim-milk cheese proposed as optional ingredient. Hearing expected soon, but date not yet set.
3. *Canned tuna*, hearing expected in 1952, but no date set; initiative of Administrator.
4. *Frozen vegetables*, hearing expected next year (1953); initiative of Administrator.

Hearings in Progress

1. *Ice cream*, new, standard of identity. Several weeks of direct testimony on harmlessness of surface-active agents preceded a recess from Feb. 20 to Mar. 24. Cross-examination of witnesses on this subject, plus some general testimony by F&DA and others, should close the hearing.
2. *Canned pineapple*, new, fill of container. Recessed hearing, originally scheduled for Mar. 4, postponed to Apr. 22 by notice published on page 1829, Feb. 29 *Federal Register*.

Tentative Orders Awaited

1. *Residue tolerances*, new, on fresh fruits and vegetables. Expected during summer of 1952; hearing adjourned Sept. 1950; briefs filed Dec. 1950.
2. *Canned pineapple and canned pineapple juice*, new, standards of identity, quality, and fill of container. Expected during summer of 1952; hearing adjourned Nov. 1951, except for standards of fill of container for canned pineapple (see preceding section); briefs filed in Dec. 1951.

Final Orders Awaited

1. *Bread*, new, standard of identity. Expected very soon; tentative order published Aug. 1950; exceptions filed in Nov. 1950.
2. *Frozen fruits*, new, standards of identity and fill. Expected very soon; tentative order published in Oct. 1950; exceptions filed in Jan. 1951.
3. *Canned mushrooms*, amendment, standards of identity and fill. Not expected soon; tentative order published in Feb. 1951; exceptions filed in Apr. 1951.
4. *Fruit preserves, jellies, and butters*, amendment, standard of identity. Expected very soon; tentative order published in July; exceptions filed in August.
5. *Margarine*, amendments, stand-

Votator

THROUGHOUT the food processing industry, VOTATOR Heat-transfer Apparatus is used: for heating and cooling, sterilizing, plasticizing, emulsifying, crystallizing, quick-freezing and aerating. This equipment operates on a continuous, closed-system basis, under precise mechanical control. Product handling, waste and labor requirements are reduced. With the closed system, purity is assured.

Girdler's complete service includes process engineering and design, and construction of process facilities. Girdler's pilot plant and

Complete engineering service for your processing problems!

laboratories are utilized constantly for the development of new processes and equipment, or are available for special research on new processing applications. You can call on Girdler's experience with confidence . . . it is backed by proved results. Outstanding Girdler chemists and engineers have developed many distinctive processes and apparatus in the field of food technology. Complete processing plants have been built for many leading companies. For information write The Girdler Corporation, Votator Division, Louisville 1, Kentucky. West Coast Office: 2612 Russ Building, San Francisco 4, California.

VOTATOR is a registered trade mark of The Girdler Corporation

WIDE APPLICATION

Food Products	Function of Votator Apparatus
Cream Style Corn	Sterilizing and Cooling
Dog Food	Cooking, Sterilizing and Cooling
Chocolate Milk Drink	Sterilizing and Cooling
Edible Starch (For Salad Dressing)	Cooking and Cooling
Pie Filling	Cooking, Pasteurizing and Cooling
Strained Food	Sterilizing and Cooling
Soup	Sterilizing and Cooling
Lard	Chilling and Plasticizing
Margarine	Continuous Manufacture
Shortening	Chilling and Plasticizing
Sweetened Condensed Milk	Cooling and Crystallizing of Sugars
Invert Syrup	Cooling and Crystallizing of Sugars
Eggs	Pasteurizing and/or Chilling
Concentrates, Fruit Juices and Purees	Slush-Freezing
Juice Concentrates	Enzyme De-Activation, Sterilization, Cooling

the GIRDLER Corporation

VOTATOR DIVISION

YARNALL-WARING CO., 127 Mermaid Ave., Philadelphia 18, Pa.

The Research Laboratories of

FOSTER D. SNELL, Inc.

Can Be Yours For

Improved Products
Protective Packaging
Formulation Evaluation
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Conformity to
Government "specs"
and Regulations

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Every Form of Chemical Service

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Cordially Invited

RESEARCH LABORATORIES
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Send us a sample
OF ANY STOCK YOU WANT TO PULVERIZE

We'll make a test grind with

SCHUTZ-O'NEILL PULVERIZER

You will receive our Engineering Report suggesting the best method to use and the type of Schutz-O'Neill Pulverizer and any receiving or sifting equipment suited to your requirements.

SCHUTZ-O'NEILL offers you the benefit of more than a half century of experience in rapid, accurate, dustless pulverizing of any dry, grindable, non-gritty stock.

SCHUTZ-O'NEILL Pulverizers are made in 6 sizes with capacities up to 2000 lbs. per hr. Also Gyrator Sifters, Rollers Mills, Receiver Boxes, Collectors, Hammermills, etc.

When sending sample, be sure to State fineness desired.

ESTABLISHED 1893 SCHUTZ-O'NEILL CO.
309 Portland Ave., Minneapolis 15, Minn.

Schedule of Events

April

15–17—Food & Container Institute, Research & Development section, fifth annual meeting; Palmer House, Chicago.

19–20—Institute of American Poultry Industries, sanitation school; Beatrice Foods Co. auditorium, Chicago.

21–24—National Fisheries Institute, 7th annual convention; Biltmore Hotel, Los Angeles.

24–25—Pennsylvania Manufacturing Confectioners' Assn., 6th annual production conference; Lehigh U., Bethlehem.

28–30—American Oil Chemists' Society, spring meeting; Shamrock Hotel, Houston.

27–May 1—Society of American Bacteriologists, annual meeting; Boston.

May

2– 4—Refrigeration Research Foundation, annual meeting; Roosevelt Hotel, New Orleans.

5– 8—American Society of Brewing Chemists, annual convention; King Edward Hotel, Toronto, Can.

7– 9—Industrial Waste Conference, 7th annual; Memorial Union, Purdue University, Lafayette, Ind.

22–24—American Society for Quality Control, 6th annual convention; Onondaga County War Memorial Building, Syracuse, N. Y.

ard of identity. Expected soon; tentative order published in October; exceptions filed in December.

Standards Completed

None since last reported.

USDA Grade Standards

Recent actions by Production & Marketing Administration of U. S. Department of Agriculture on U. S. Grade Standards and related activities include the following:

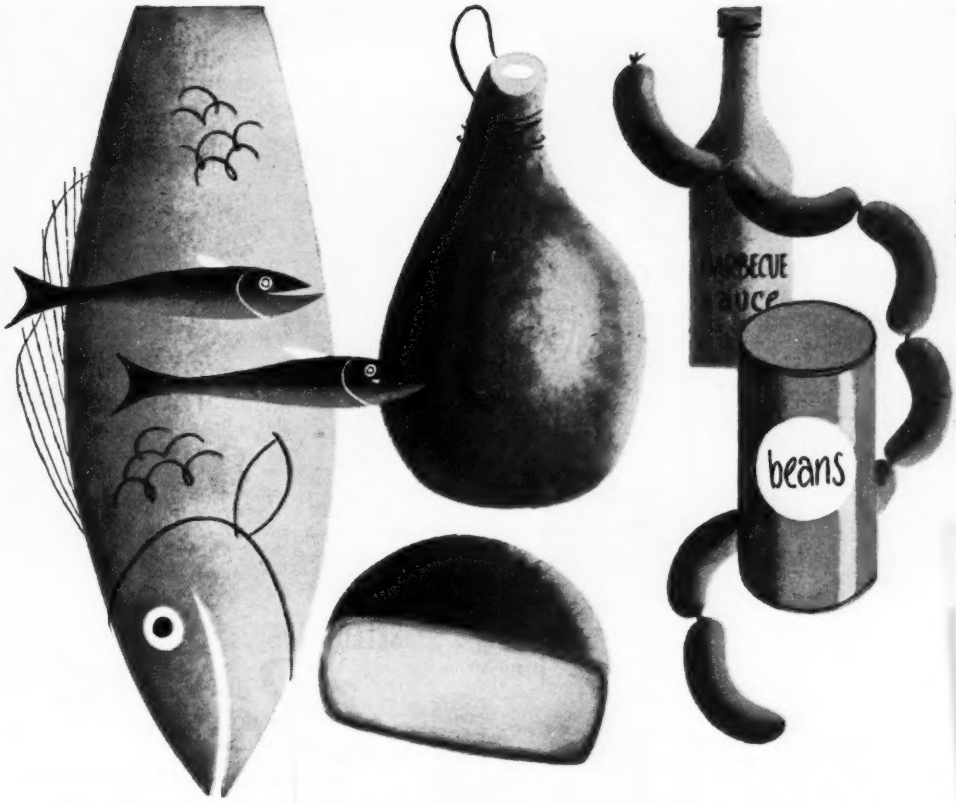
Frozen leafy greens (other than spinach), new, proposed, page 1620, Feb. 21 *Federal Register*, written comments received until Mar. 22.

Canned concentrated orange juice, second revision, proposed, page 1621, Feb. 21 *Federal Register*, written comments received until Mar. 22.

Edible sugar-cane molasses, further revision, proposed, page 4620, May 17, 1951 *Federal Register*, written comments received until Apr. 1 (public hearings scheduled for Mar. 6 in New Orleans by announcement on page 1858, Mar. 1 *Federal Register*).

Currants for processing, new, proposed, page 1859, Mar. 1 *Federal Register*, written comments received until Mar. 31.

Butter, revised, proposed, deadline for receipt of written comments extended to May 8 by an announcement on page 2018, Mar. 7 *Federal Register*.



SYNTHETIC HICKORY SMOKE FLAVOR

Appetizing hickory smoke flavor may now be incorporated quickly and efficiently in a wide variety of food products, including meats, fish, cheese, and sauces. Based upon original research, our newly developed synthetic hickory smoke flavor is stable to high temperatures and is capable of long shelf life under adverse storage conditions. Affecting minimum shrinkage, convenient application of this flavor is accomplished by its ready dispersion in brines and liquid products or by dry mixing with salt or other meat-curing preparations.

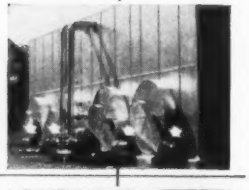
FIRMENICH INCORPORATED
250 WEST 18th ST., NEW YORK 11

CHICAGO OFFICE: 612 NORTH MICHIGAN AVENUE
FIRMENICH OF CANADA LTD., 348 WALLACE AVENUE, TORONTO
GENEVA, SWITZERLAND . . . PARIS, FRANCE . . . LONDON, ENGLAND

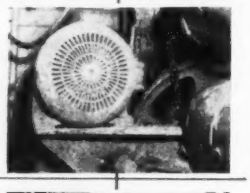
FIRMENICH & CIE.
SUCCESSEURS DE
CHUIT, NAEF & CIE.
GENEVE SUISSE

SELECT THE

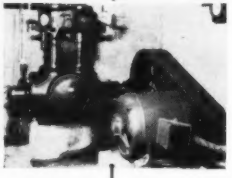
Century



Here are Century splash proof motor's driving fans out in the open, without any protection. You can use the same motors where the plant must be washed down with a hose. Or where there are splashing liquids or falling objects of any kind.



Here is an installation using an explosion proof motor in a tung oil processing plant. You can see how the material clings to the motor and equipment, but it can't affect the vital parts of this Century explosion proof motor.



Here is a motor on a refrigeration compressor in a nice clean room. An open type Century general purpose drip proof motor is therefore used.

CE-732

MOTOR FRAME PROTECTION TO MEET THE CONDITION

Century Motor users in many different classes of industry are paying more and more attention to electric motor protection. Careful motor selection pays big dividends by keeping production TURNING where atmospheric hazards might affect the vital parts of the motor.

You Can Select Century Motors for:

- Normally clean plants.
- Splashing liquids or falling objects. For indoor or outdoor operation.
- For atmospheres containing—oil fog—dust—grit—abrasives—chemicals.
- Explosives.
- Textile lint.

Specify the kind of protection you require on the motorized equipment you purchase. Specify Century motors for the protection that will keep your production turning.

Century C MOTORS

CENTURY ELECTRIC COMPANY

1806 PINE STREET • ST. LOUIS 3, MISSOURI • OFFICES AND STOCK POINTS IN PRINCIPAL CITIES

Air-Contaminating Odors Banished

—Continued from page 76

the scrubber tower, making a total of 32,000 cfm. of air being deodorized with chlorine-dioxide water.

As a result of the improvements already made, complaints from the neighboring community have been reduced to a minimum, and there are no more threats of court action. When the odor control system is completed, it is believed that the problem, which had led to plant shut-down threats, will have been solved, and the public relations vastly improved.

Kentucky Plant Case

In a rendering plant in Kentucky, chlorine dioxide has proved to be equally successful in chemically destroying obnoxious plant odors. Scrubber towers using a strong solution of calcium hypochlorite failed to stop complaints in a residential district, and the local court had enforced reduction of plant operation from 24 to 12 hr. per day. Also, the plant operators were restricted as to the type of raw stock they could process. Since the chlorine-dioxide system was installed, the plant has been allowed to resume operations on a 24-hr. per day schedule, without restriction as to types of charging stock.

In this plant, odors had come from two buildings, each provided with a fan capable of evacuating the contained atmosphere in a few minutes. The effluent is blown through a separate square tower. The smaller tower is 3 by 3 by 15 ft. high, and the larger is 5 by 5 by 20 ft. A tank at the base of each tower serves as a reservoir from which water is drawn by a centrifugal pump and discharged to the spray head in the tower.

The larger tower has 55 spray nozzles in groups at various levels, and the pump, driven by a 5-hp. motor, circulates 250 gal. of water per minute. The reservoir holds about 1,000 gal. of water, which contains 100 to 500 ppm. of available chlorine as chlorine dioxide, according to the severity of the odor condition to be handled.

Fish Meal Plant Odors

In a plant in New England, fish meal odor complaints came from a nearby colony of summer residents. A chlorinator had been installed, together with an adequate collecting system and scrubber tower. However, chlorine alone failed to kill the objectionable fishy odors. Now, the chlorinator is used as an operating part of the chlorine dioxide odor-control system.

Sodium chlorite solution is delivered from a crock by a proportioning pump to the base of the solution generator, packed with Raschig rings. Chlorine-water from the chlorinator is also fed to the base of the generator. Reaction between chlorine and sodium chlorite at room temperature and at pH below 3.5 generates chlorine dioxide in solution. Presence of the chlorine-dioxide gas is shown by a distinct greenish-yellow color in the water passing through the mixing chamber.

The stream leaving the generator contains chlorine dioxide and some excess chlorine in aqueous solution. The chlorine-dioxide water is used to dose the condenser water that scrubs the odor-bearing vapors coming off the dryers.

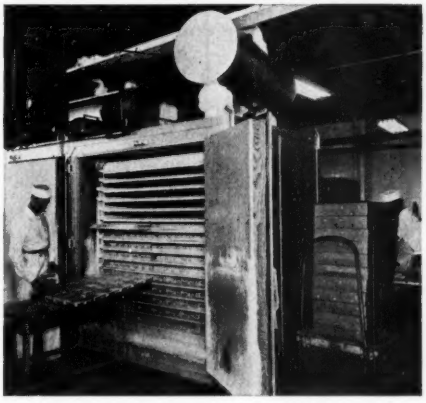
Plant owners have found the chlorine-dioxide system to be so successful that they will apply it at four additional fish rendering plants in other parts of the U. S. and Canada.

End (Resume reading on page 77)

Poultry Processors Know It's Right — When They Freeze With

Amerio CONTACT PLATE FREEZERS

(Patent Applied For)



These units are engineered with one principle standing foremost in mind. That is "the faster the freeze, the finer the product". Thus full flavor is retained and quality assured.

A key factor in the operating efficiency of the Amerio Contact Plate Freezer is that the flat uniform packages provide stable stacking in dispensing units. This aids store convenience and consumer appeal.

Amerio Freezer Installation—Youngblood's Poultry & Processing Co., Waco, Texas

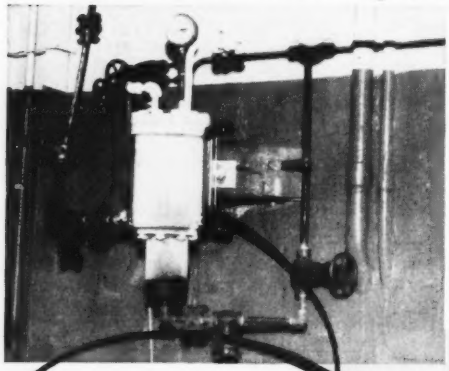
Economical - Speedy - Continuous High Production

Designed For Ammonia, Brine or Freon Refrigerant

Amerio
Contact Plate Freezers Inc.
Union City, N. J.
"It's the Contacts that Count"

Send For New, Illustrated Brochure

Want More Refrigerating Capacity from Your Present System?



An Armstrong Purger May Be the Answer—

HOW many tons additional refrigeration would a 5% increase in capacity net you? You can probably get at least a 5% boost simply by installing an Armstrong Forged Steel Purger to automatically remove *all* air and other non-condensables. Most plants relying on manual purging are *not* getting all the air out and efficiency is suffering accordingly.

YOUR COMPRESSOR HEAD PRESSURE TELLS THE STORY

CHECK the head pressure of your system and compare with what it should be. Every 4 lbs. excess pressure means 1% less capacity and 2% greater power costs. Non-condensable gas is the cause.

OTHER BENEFITS

COMPLETE air removal with an Armstrong Purger not only increases capacity but results in power, labor, water, and refrigerant savings as well. The case studies at right indicate the scope of these savings.

For Full Details Send for Bulletin 192
. . . fully explains Armstrong Purgers, their benefits, and why you get them.

ARMSTRONG MACHINE WORKS
881 Maple Street, Three Rivers, Mich.

IT WAS FOR THESE PLANTS:—

- **Velvet Freeze, Inc., Kansas City, increased capacity 7½%, saved $255 in ammonia in six months and reduced power costs $274 a month.**
- **Planters Nut & Chocolate Co., Suffolk, Va., increased capacity 5%, cut power costs $250 per month.**
- **Crystal Ice Service, Inc., New Orleans, increased plant capacity 6% when an Armstrong Purger lowered head pressure 25 lbs.**
- **H. A. McDonald Creamery, Detroit, increased capacity 7½%, cut power costs $275 per month.**

ARMSTRONG PURGERS

Men & Companies

J. Huber Wetenhall has been elected a vice-president of National Dairy Products Corp. (Bachrach photo)

Industry

Amalgamated Sugar Co. has placed its first Pacific Northwest industrial liquid sugar plant in operation. Capacity: 86,000 gal. every 24 hr.

Armour and Company has established a full-tuition graduate scholarship in food engineering at Illinois Institute of Technology for 1952-53.

The Borden Co. has purchased Harms' Dairy in Savannah, Ga., and Bassett Dairies, Inc., in Tallahassee, Fla.

W. J. Bush Co., Ltd., is building an essences plant in Montreal, Canada. Cost: $400,000.

Canada Packers Ltd. is constructing a $350,000 extension to its meat packing facilities in Charlottetown, Prince Edward Island, Canada.

Albert Ehlers, Inc., coffee and tea merchant of Brooklyn, has acquired George S. Wallen Co. Latter will be operated as a subsidiary.

Kellogg Co. is holding top-level talks in Columbia on possibility of building a factory to make Corn Flakes there.

Kraft Foods Ltd. of Canada has purchased properties at Moncton, N. B., Halifax, N. S., and Winnipeg, Man., for the building of new plants.

Louisville Vegetable Oil Co. has been formed in Louisville, Ky., for manufacture of vegetable oils. Capital stock: $200,000.

I. Miller Pickles, Inc., is now moving operations into recently acquired Brocton Preserving Co. facilities. Purchase price was $375,000.

Monroe Purity Ice Cream Co., Inc., has been organized to deal in ice cream and by-products. Capital stock: $250,000.

Ocoma Foods Co., packer and processor of poultry, is now in full operation. Plant is capable of handling 40,000 birds per day.

Oregon Frozen Food Co. has purchased Bridgeford food processing plant at Ontario, Ore., from Reconstruction Finance Corp. on a bid of $500,000.

Quaker Oats Co. is negotiating with Prudential Insurance Co. for a loan to run 25 years. Amount: $20,000,000.

Retail Grocers Exchange plans to build a warehouse and office building near Wilmington, Del. Cost: $250,000.

Smithline Foods Corp., New York City, is in process of equipping its new plant with machinery as a part of current expansion program.

Southern Biscuit Co. has completed construction of extensions to its plant in Virginia. Cost: $1,000,000.

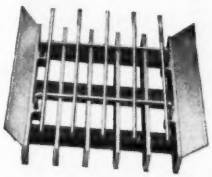
Sterling Sugars, Inc., of New Orleans, has been sold to Earl B. Wilson, who becomes board chairman.

Sunkist Growers, Inc., is new name of California Fruit Growers Exchange.

Washington Farmers' Cooperative will build a poultry processing plant at Sunnyside, Wash. Cost: $400,000.

W. H. Gerhard was recently elected vice-president in charge of production for Grocery Store Products Co.

you can't drop a nail through this grate



Climb up high and drop a steel nail on this magnetic grate. Or throw nail as hard as you can against it. The nail simply can't get through.

It's obvious that the nail or other iron or steel piece will first strike a grid wire or a grate bar. That will check the momentum. Then the object will be caught with a strong magnetic grip.

The Bauer Magnetic Grate is laid on a frame in a hopper throat or floor opening to catch all steel and iron inclusions in flowable materials—grain, nuts, seeds, fruits, coffee, tea, spices, sand, clay, lime, chemicals. The grates work well in liquids, too.

Ask for Bulletin M-3-A which fully describes the magnetic grate and other Bauer Magnetic Separators.

THE BAUER BROS. CO.

1740 Sheridan Ave. • Springfield, Ohio

DON'T LOSE PROFIT DOWN THE SEWER!

LANGSENKAMP 3-WAY VALVE

Stop wasting valuable product. Langsenkamp three-way valve provides positive one-point control. Eliminates loss of product by accidental releasing of old time tank plug, and prevents possibility of back pressure lifting plug permitting raw stock entering filler line.

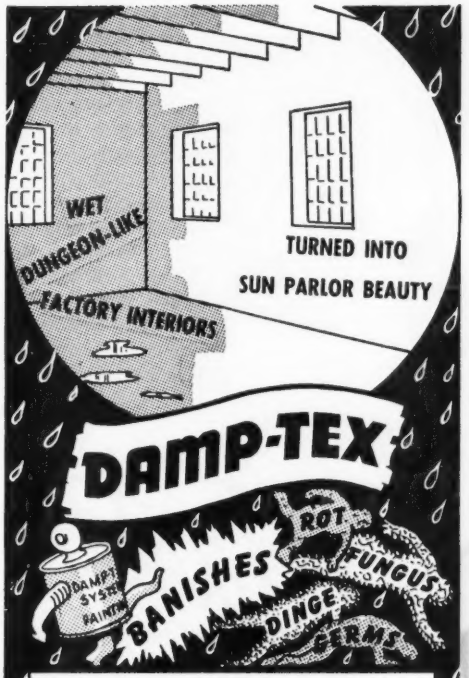
Install Langsenkamp 3-way valve . . . supplies positive one-point control and saves time as well.

Position #1—All positions closed.
Position #2—Straight through.
Position #3—To waste line.

WRITE TODAY FOR MORE INFORMATION.

F. H. LANGSENKAMP CO.

235 E. South St. Indianapolis 25, Ind.



Now beautiful porcelain-like lasting beauty and protection against corrosion from moisture, steam, 2% caustic, corrosive acids, gases, etc. Proved for years in more than 9600 industrial plants—Damp-Tex—the wet surface enamel, offers unmatched dependability and satisfactory service. It adheres to any paintable interior wet or dry surface. Will not crack, chip, or peel. Based on extra high coverage, greater hiding power and prolonged durability—Damp-Tex proves 25% less expensive in actual usage.

Write for Folder "FE".

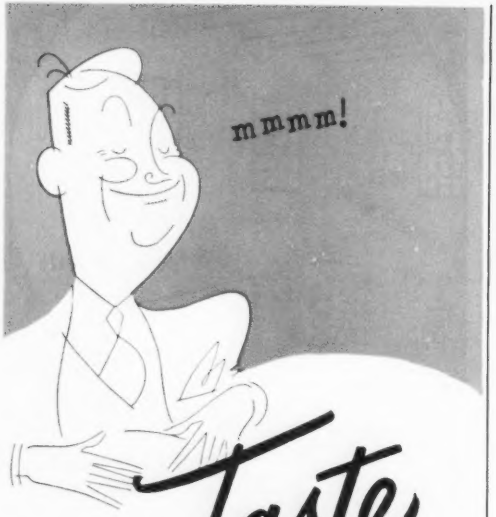
BIG NEWS

STAINLESS STEEL COATING

Now, for equipment and metal surfaces subjected to extreme alkali and acid conditions. Brush or Spray. Cost less than 4¢ per square foot. Write for information.

STEELCOTE MFG. CO., St. Louis 3, Mo.

Canadian Manufacturer
STANDARD PAINT & VARNISH CO., WINDSOR, CANADA
Canadian Industrial Distributor
G. H. WOOD & CO., LTD., TORONTO



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the difference yourself

TRY ADDING A LITTLE

Huron MSG

MONOSODIUM GLUTAMATE 99+%

TO YOUR PRESENT FORMULA

Manufacturers of fine food products the country over have discovered for themselves how small quantities of Huron MSG intensifies, heightens and rounds out the flavor of already fine products. No formula change is necessary and the cost is surprisingly low.

Proof—try it yourself on your own products and discover how an increase in flavor appeal can mean more sales appeal. Simply drop us a line today for samples. Or our Technical Service Department will be glad to make specific recommendations.

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Factories—Harbor Beach, Michigan

Gen. Sales Offices—9 Park Place, New York City 7

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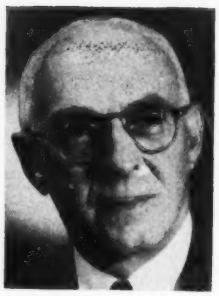


Roe S. Clark was recently elected president of Package Machinery Co. He continues also as treasurer and director.

Bob White Organization has purchased He-Man Foods Corp. and VanBell Fine Foods, Inc., both Miami firms canning tropical food products.

Personnel

John R. Anstis has been named managing director of Cow & Gate Ltd., Dominion Milk Products, and General Milk Products of Canada Ltd.

H. J. Barkwill is now president of Canned Foods Assn. of British Columbia.

Dr. H. E. Brewbaker, director of experiment station for Great Western Sugar Co., is on leave to assist Israel in beet sugar development.

W. L. Bundy has been elected president of Arkansas Bottlers of Carbonated Beverages.

C. E. Cormany was recently elected president of the American Society of Sugar Beet Technologists.

Dr. John C. Garey is now manager of the special products division of Red Star Yeast & Products Co., Milwaukee.

Strother Hogue has been elected president of Bluefield (W. Va.) Produce & Provision Co. He fills vacancy left by death of his father, Joseph H. Hogue.

C. K. Hood has been elected to a vice-presidency of Worthington Pump & Machinery Corp.

Edward C. Johnston is now president of Robert A. Johnston Co., Milwaukee, maker of candy, biscuits, and chocolate. He succeeds Harry S. Johnston, retired.

A. C. McGeath, American Box Board Co., Chicago, has been made vice-president of Society of Industrial Packaging & Materials Handling Engineers.

Leon A. Miller has been appointed director of sales and advertising of General Foods' Post Cereals Div.

Charles G. Mortimer, Jr., has been elected executive vice-president of General Foods Corp.

J. Richards Nelson of J. S. Mansfield Co., New Haven, Conn., is now president of Oyster Institute of North America.

Harris Perlstein, president of Pabst Brewing Co., has been elected vice-president of U. S. Brewers Foundation.

Leslie N. Perrin, president of General Mills, Inc., will be general co-chairman of next fall's Community Chest campaign and will head the drive in 1953.

Richard Schmidt is now board chairman of Schmidt Lithograph Co. Succeeding him as president is Carl R. Schmidt.

E. A. Seipp, Jr., has been appointed manager of new products division of Golden State Co., Ltd.

Fred Stock, president of Stock's Quality Food Products Co., Reading, Pa., has been elected president of National Potato Chip Institute.

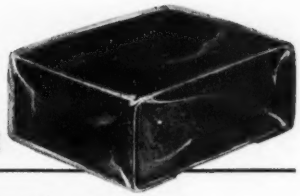
G. E. Wallis is now board chairman and chief executive officer of The Creamery Package Mfg. Co., Chicago.

W. N. Waterstreet has been named executive vice-president of Chicago milk division of the Borden Co. He started with Borden in 1939 as milk plant worker.

H. Frederick Willkie, brother of late Wendell Willkie, has

John P. Emmett has been named head of Detrex Corp.'s new products department and will be in charge of market expansion.

TO STOP THE EYE ...START THE SALE



package to attract with this automatic wrapper

—CUTS COSTS—WRAPS WITH AMAZING HIGH SPEED!

No matter what the product — how solid or fragile — how irregular its shape . . . it becomes a package of eye-appealing beauty when "float" wrapped on the Campbell Wrapper. This continuous feed machine delivers *without breakage* up to 160 single or multiple packaged units per minute, dependent on product. Using wrap materials of all types, it completely heat or glue seals — with crimp or crimp folded ends. Labor saving — only one operator and packer are required in most cases. *Ideal* for most products — *perfect* for prepackaged foods and meats. Write for fully illustrated brochure.

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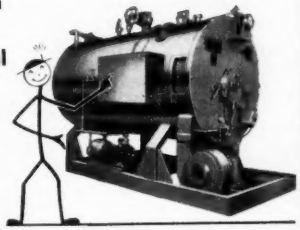
Aniline and Gravure Printers, Folders, Interfolders, Laminators, Waxers, Embossers, Slitters, Sheeters, Roll Winders, Packaging Machines, Crepers and Tissue Converting Units.

ACCESSIBLE! THAT'S THE AMESTEAM GENERATOR FROM EVERY ANGLE

Eye-Level Controls . . . Protected from Dirt, Water and Accidental Damage . . . And Look at the Space Underneath Shell, too!



EVERYTHING'S Easy-To-Get-At!

10 to 500 h.p. — 15# to 200# w.p.

OIL or GAS

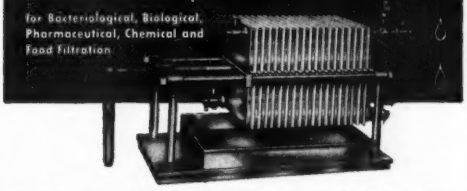
AMES IRON WORKS

BOX F-4, OSWEGO, N.Y.

Builders of Better Boilers Since 1848

NOW...an *All* FABRICATED STAINLESS STEEL "SANITYPE" PRESSURE FILTER

for Bacteriological, Biological, Pharmaceutical, Chemical and Food Filtration



Here is a filter that's practically "made to order" for the food processor. It's all stainless steel, constructed entirely of plate and bar stock, with NO porous, pitted or rough surfaces. Every part coming in contact with liquid is HIGHLY POLISHED . . . permitting easy and thorough cleaning of the filter, assuring better and more positive filtration. Quickly opened and closed. Flexible for double filtration. No rubber washers. Uses any type filter pad, paper or cloth.

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Yes, we'd like to have a copy of your catalog containing details on the SANITYPE filter.

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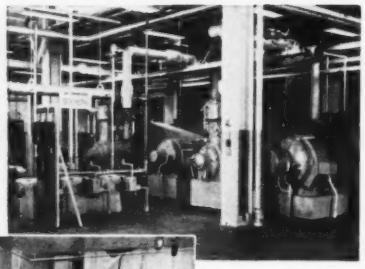

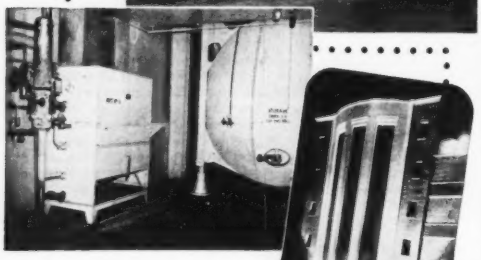

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It's VILTER Again—

● Deriving its slogan, "Genial Host," from the translation of its name, the Frankenmuth Brewing Company is the pride of friendly old Frankenmuth, Michigan. As early as 1840, a group of pioneers settled there because of the pure, sparkling spring water. Interestingly, these springs still supply the water from which Frankenmuth products—beer, bock, and ale—are brewed.

Naturally, when Frankenmuth began their extensive remodeling and re-building program, Vilter refrigeration was slated for an important part. Vilter compressors, condensers, air units, super capacity water coolers, liquid receivers, and other equipment contribute to the modern efficiency of this model brewery.

It's no surprise to see Vilter selected time and time again as America's alert breweries expand and modernize. Over half of the breweries in the country know Vilter quality and Vilter economy from their own experience. They know that Vilter equipment lasts longer, runs at lower cost, requires less maintenance, so it's only natural that many a brewery has re-ordered Vilter for over 50 years.

Vilter

Your nearby Vilter Distributor or Representative will be glad to show you how you can save with Vilter. Vilter knows brewing.

REFRIGERATION and AIR CONDITIONING

THE VILTER MANUFACTURING COMPANY
MILWAUKEE 7, WISCONSIN

Ammonia and Freon Compressors • Evaporative and Shell Tube Condensers
Double Pipe Coolers • Baudelot Coolers • Pipe Coils • Valves and Fittings

William de Back, vice-president and director of Food Machinery & Chemical Corp., has just become vice-chairman and managing director of the FMC affiliated company, International Machinery Corp., S.A., of St. Nicolas-Waas, Belgium.

been voted out as president of Kingan & Co., meat packing concern. He was replaced by W. R. Sinclair, former president.

Associate Industry

American Agile Corp., maker of Agilene (polyethylene) and Agilide (hard polyvinyl chloride) products announces completion of a new 12,500 sq. ft. building.

American Can Co. will open its plant in Stockton, Calif., May 1. Annual capacity: 350,000,000 containers.

Beckman Instruments, Inc., announces plans to build a modern plant in the West for developing and making precision instruments and electronic equipment.

Canadian Canners Ltd. will complete its large new cannery in Manitoba, Canada, this spring.

Dixie Cup Co. has leased from Daystrom, Inc., a plant in Anaheim, Calif., which goes into operation this month.

Robert Gair Co., Inc., has purchased from Owens-Illinois Glass Co. the plants, business, and inventories of the American Coating Mills.

Homestead Valve Mfg. Co. has appointed Don H. Krey as vice-president of sales, and John W. Force as vice-president of engineering.

Ingersoll Products Div. of Borg-Warner Corp. has appointed Thur Schmidt as director of research and development.

Link-Belt Co. has named Raymond S. Wood general manager of its Ball & Roller Bearing Plant in Indianapolis.

Macwhyte Co., maker of wire, wire rope, slings, etc., has elected George C. Wilder as vice-president and general manager.

National Wooden Box Assn. recently elected D. A. McNeill, Jr., of Lauff & McNeill, Thomson, Ga., as president.

Olin Cellophane Div. of Olin Industries, Inc., announces appointment of Dr. Charles H. Hofrichter, Jr., as chief of research and development.

A. M. Steigerwald Co., Chicago, designer and producer of labels, announces purchase of Labels Inc., Minneapolis.

C. H. Wheeler Mfg. Co. has appointed Zay B. Curtis, Jr., as assistant to its president. He will be in charge of all Philadelphia plant production.

Deaths

Dr. Fred Finley Fitzgerald, 69, research director of American Can Co. from 1935 to retirement in 1942—Feb. 7.

Carl C. Giles, 75, president of Phoenix Metal Cap Co.—Feb. 10.

Morris E. Leeds, 82, founder and board chairman of Leeds & Northrup Co., maker of electrical instruments, controls, furnaces—Feb. 8.

Robert Dwight Reynolds, 42, president of R. D. Reynolds Cheese Co., New York—Feb. 15.

Harry C. Winslow, 72, treasurer and founder of Winslow Potato Chip Co., Marblehead, Mass.—Feb. 21.

W. Grason Winterbottom, 83, last of founders of Phillips Packaging Co., Inc., Cambridge, Md.—Feb. 13.

Dr. R. J. Kunz is now director of production and engineering of special products division of Borden Co.

Recent Inventions

Products

Preparing Fruit Flavors by Separating Rind From Pulp Shortly After Harvesting, Communiting Rind and Combining With Sugar, Adding Mixture to Fruit Juice, Quick-Freezing—*J. Bartels, Dobbs Ferry, N. Y. No. 2,578,915. Dec. 18, 1951.*

Caramel Color of High Acid Stability Made by Pretreating High Dextrose Syrup at pH 0.2-4.0, Heating to 200–250 deg. F., Adding Ammonia Alkaline Reagent to Increase pH to 3-7.5 and Caramelizing With Acidity Above pH 2.0—*J. B. Longnecker, Granite City, Ill., to Union Starch and Refining Co., Columbus, Ind. No. 2,582,261. Jan. 15, 1952.*

Milk Protein Product Made With Water-Insoluble Crystalline Potassium Metaphosphate Prepared by Heating at Between 600 deg. C. and Its Melting Point.—*E. P. Patridge, Beaver, Pa., to Hall Laboratories, Inc., Pittsburgh, Pa. No. 2, 582,353. Jan. 15, 1952.*

Modified Starch Product Consisting of Flour With 80 Percent Starch and 0.1 to 2 Percent Aluminum Chloride, Mixed Under Heat and Evaporation to Produce a Higher Reducing Sugars Content—*W. H. Hart, Winnetka, Ill. No. 2,585,651. Feb. 12, 1952.*

Palatable Food Product From Whey by Digesting Precipitated Curd With Protease and 1-2 Percent Salt at 20-50 deg. C. Until Solids-Not-Fat Contain 0.1-0.2 Percent Amino Nitrogen, Then Inactivating Enzyme—*J. P. Malkames, Jr. Silver Springs, Md. to U. S. A. No. 2,585,951. Feb. 19, 1952.*

Bloom Inhibited Chocolate Containing at Least 0.5 Percent Fatty Acid Ester and Oxyalkalene Fatty Acid Ester Mixture—*S. T. Cross, Elsmere, Del. to People of U.S.A. by Pennsylvania Mfg. Confectioners Assn. No. 2,586,615. Feb. 19, 1952.*

Processing

Thermal Treatment of Heavy Consistency Canned Foods by Steam-Pressure Heating Outer Portions to Desired Temperature and Holding Under Pressure Until Heat Penetrates to Can Center—*C. F. Martin and V. O. Wodicka, to Libby, McNeill & Libby, Chicago. No. 2,578,437. Dec. 11, 1951.*

Continuously Deodorizing and Stabilizing Soybean Oil by Reducing Iodine Value by Hydrolxylation Through Air Treatment in Presence of Catalyst, Deaerating, Drying by Heating at Reduced Pressure and Cooling—*R. A. Carleton, Mamaroneck, N. Y. No. 2,578,670. Dec. 18, 1951.*

Method of Controlling Stem-End Decay of Citrus Fruits by Contacting With Aqueous Solution of Salicyl Anilide Solubilized With Organic Amine Base—*M. A. Slade, Jr. and R. D. Gerwe, Lakeland, Fla., to Food Machinery & Chemical Corp., San Jose, Calif. No. 2,578,752. Dec. 18, 1951.*

Deionizing Sugar Solutions by Passage Through Anion Exchange Resin Which is Primarily Quaternary Ammonium Hydroxide Groups, and Cation Exchange Resin Which is Primarily Carboxylic Acid Groups—*R. Kunin, Trenton, and F. X. McGarvey, Hadden Heights, N. J., to Rohm & Haas Co., Philadelphia. No. 2,578,938. Dec. 18, 1951.*

Preparing Nuts for Blanching by Mildly Steaming for 1-3 min., at 212 deg. F. and Rapidly Heating 5-20 min. at 260-290 deg. F.—*J. Steiner, to The Kelling Nut Co., Chicago. No. 2,579,925. Dec. 18, 1951.*

Clarifying Synthetic Oil Derived From Esterified Fatty Acid by Treatment With Phthalic Anhydride and Removing Precipitate—*W. A. Jordan and H. Wittcoff, to General Mills, Inc., Minneapolis. No. 2,579,499. Dec. 25, 1951.*

Process for Recovering Edible Gelatin From Collagen-Bearing Material by Communiting, Flash Heating by Steam Jets While in Turbulent Agitation, Reducing Pressure to Atmospheric and Centrifugally Separating Gelatin From Liquid Fraction—*R. H. Sifferd, Clarendon Hills and L. P. Anderson, to Armour and Co., Chicago. No. 2,580,049. Dec. 25, 1951.*

Process of Roasting Coffee to Dehydrate and Color Involving Three Zones of Heat Treatment With Separate Time-Temperature Relationships—*W. S. Scull, 2nd., Bryn Mawr, and G. A. Fisher, Sellinsgrove, Pa., to Wm. S. Scull Co., Camden, N. J. No. 2,581,148. Jan. 1, 1952.*

Pretreating Fruits and Vegetables Prior to Freezing by Expelling Air From Product-Containing Space With Either Water or Steam at 100 deg. C. Then Cooling and Producing Vacuum by Condensing Water Vapor—*O. Helgerud, Oslo, Norway. No. 2,581,484. Jan. 8, 1952.*

Treating Nut Meats by Toasting in Granular Heat Transfer Medium, Separating, Spraying Thin Surface Coat of Edible Adhesive, Applying Table Salt While Coat is Moist—*J. A. Zaloom, Rutherford, N. J. No. 2,582,188. Jan. 8, 1952.*

MEN SCARCE?
2
BIN-DICATORS
OFTEN
RELEASE
ONE
MAN
FOR OTHER
WORK
BIN-FLO
AERATOR
UNITS
KEEP
BULK
MATERIALS
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Always on the job—and doing it. Low first cost; negligible operating cost. Used on over 100 materials. Fully guaranteed. Write for free book.
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They ride "like a dream" on the smooth table-top surface of the #815 Rex Chain . . . with no rough or high spots to cause spilling or breaking. And there are no "pockets" to encourage bacteria growth! Available in steel or stainless steel in any length and three standard widths. Sturdily built for years of trouble-free use. Easily installed and serviced.
Carries your products safely and smoothly in a single file through various stages of your production line, such as filling, capping, labelling, etc.
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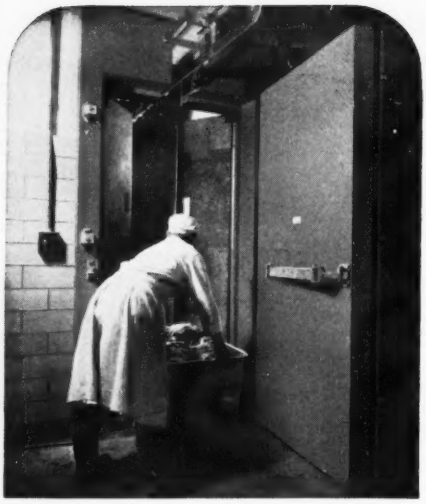
vestibule track doors
Speed handling— Save refrigeration

Series "50" Vestibule Track Doors with "Marine Quality" plastic bonded plywood, one piece front and rear panels, installed in the modern meat packing plant of Schulz Brothers & Company, Cincinnati, Ohio.

EASY TO OPEN — Door swings easily on ball bearing equipped Adjustoflex hinges.



VESTIBULE DOORS SWING OPEN—Free swinging double batten doors, close automatically to save refrigeration.

FAST MOVEMENT ON TRACK RAIL—Track port opens and closes automatically with door to permit movement of material on track rail. Compensator permits door to close without damage if there is any obstruction.

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For specifications and dimensions of this and other Jamison Series "50" Doors, request Catalog No. 3. Jamison Cold Storage Door Company, Hagerstown, Maryland, U. S. A.

Treating Mutilated Section of Beef Carcass by Applying Fisciae Connective Tissue to the Area and Pressing it in Close Relation With Carcass Tissue—*W. R. Sullivan and P. J. Cleary, to Armour and Co., Chicago.* No. 2,582,296. *Jan. 15, 1952.*

Equipment

Apparatus for Continuously Treating Fruits and Vegetables by Rotating Them in Forward Movement as Treating Liquid is Applied—*J. F. Hussey, Orlando, Fla. and B. S. Johnson, Merwood Park, Pa., to Franklin Research Co., Philadelphia.* No. 2,578,427. *Dec. 11, 1951.*

Apparatus and Process for Stuffing Olives by Forming Pimento Into Flat Sheet of Uniform Thickness, Cutting Into Strips by Rotating Knives, Filling Into Cavities of Previously Pitted Olives—*G. W. Ashlock, Jr., Oakland, Calif.* No. 2,578,496. *Dec. 11, 1951.*

Apparatus for Vacuumizing, Gassing and Closing Containers Including a Rotary Turret With Plurality of Bells Which Enclose the Container While Vacuum and Inert Gas are Applied With Means for Temporary Friction Closure Prior to Permanent Sealing in Conventional Unit—*A. L. Kronquest, Syracuse, N. Y. To Continental Can Co., New York City.* No. 2,578,815. *Dec. 18, 1951.*

Machine for Packing Small Fish Into Cans Consisting of Endless Chain of Molds Which Transfer Product Into Cans by Plunger Action—*P. E. Pearson, to Continental Can Co., New York City.* No. 2,578,833. *Dec. 18, 1951.*

Capless Bottle Detector With Integrated Device for Automatically Capping Them in Continuous Line—*G. M. Stevenson, Baltimore.* No. 2,579,404. *Dec. 18, 1951.*

Flour Dusting Machine Controlled by Passage of Dough Pieces—*H. C. Rhodes, Portland, Oreg., to Read Standard Corp.* No. 2,579,514. *Dec. 25, 1951.*

Frozen Confection Flavoring Apparatus Having Series of Nozzles That Jet Flavors Onto Different Zones of the Rotating Confection—*D. L. Perlman, Baltimore.* No. 2,579,696. *Dec. 25, 1951.*

Feed of Cans to Filler Stopped by Action of Temperature Bulb Located Vertically, in the Filler Bowl and an Associated Control Device—*G. F. Jackson, Baltimore, to Continental Can Co., New York City.* No. 2,579,925. *Dec. 25, 1951.*

Patty Forming Machine Which Deposits and Mashes Portions of Ground Meat on Waxed Paper—*F. S. Elsaesser, Cincinnati.* No. 2,580,008. *Dec. 25, 1951.*

Apparatus for Processing Food Stock Comprising Conveying System, Water Tank and Spray Nozzles With Means for Elevating and Lowering Conveying Belt—*D. W. Griswold, Oberlin and H. N. Ricket, Amherst, Ohio, to The American Specialty Co., Amherst, Ohio.* No. 2,580,420. *Jan. 1, 1952.*

Machine Which Selects, Trims and Packages Sweet Corn on Cob—*G. H. Rogers, to Fairmont Canning Co., Fairmont, Minn.* No. 2,580,599. *Jan. 1, 1952.*

Suction Nozzle to Effect Discharge of Flour and Like From Bulk Storage Containers—*R. A. Norbom, New York City, to B. F. Fitch, Newport, R. I.* No. 2,580,823. *Jan. 1, 1952.*

Sugar Cane Diffusing Apparatus Comprising Elongated Trough With Drive to Move Cane Chips Through Its Length, With Separately Fed Diffusing Liquid Circulating Chambers Along the Trough Length—*A. F. de la Calle, Mexico City, to Delta Investment, Inc. Havana, Cuba.* No. 2,581,175. *Jan. 1, 1952.*

Weighing System Which Electronically Computes and Controls the Gain of Weight of Product in Processing and Automatically Terminates the Process When Weight Addition is Proportional to Original Product Size—*G. W. Reilly, Jr., Minneapolis, to Wilson and Co., Inc. Chicago.* Nos. 2,581,204 and 205. *Jan. 1, 1952.*

Candy Bar Forming and Dispensing Machine Comprising Endless Double Belt of Molds Moving Over Flexible Apron Which Forms a Bottom Wall for Mold Cavaties With Detent That Separates Mold Cup to Eject Formed Bar—*W. A. Sebring, Tyler, Tex.* No. 2,582,074. *Jan. 8, 1952.*

Centrifugal Impact Milling Machine With Cereals Directed Through Stationary Multi-Target Members Into Plurality of Rotating Flat Leading Edges—*F. S. Smith, Hamden, Conn.* No. 2,582,509. *Jan 15, 1952.*

Cooky Making Machine With Reciprocatory Motion Wire Cut-Off Mechanism—*A. E. Hein, to The Century Machine Co., Cincinnati.* No. 2,582,542. *Jan. 15, 1952.*

Fruit Pitting Machine Which Carries Halved Fruit Between Two Converging Belts of Pointed Piercing Pins That Remove and Separate the Pits from the Fruit—*W. J. Kruse and C. E. Kruse, Hatboro, Pa.* No. 2,582,636. *Jan. 15, 1952.*

Want more information on any of these recent patents? If so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.

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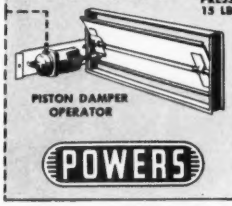

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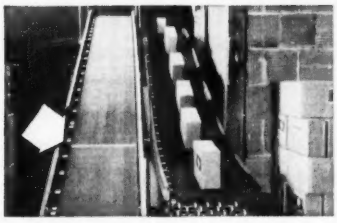

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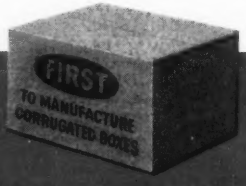

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Just Off the Press

New Catalogs and Bulletins from manufacturers of equipment and supplies — For Free Copies, Use Reader Service —

Food Plant Equipment

Hydraulic System Filters

Engineering data on synclinal type filters for sump or line installation on hydraulic and low pressure liquid recirculating systems are given in 8-page folder, No. 105.—*Marvel Engineering Co., 625 W. Jackson Blvd., Chicago 6.*

Circle L217A on Reader Service Card

Weighing Machinery

Specifically for flour and feed industries is information on scales in Bulletin 0151. Units may be used for receiving and transfer, automatic bulk weighing, automatic bagging, portable bagging, and pellet bagging. Other products outlined include bag-sewing conveyor and packer. 4 pages.—*Richardson Scale Co., Clifton, N. J.*

Circle L217B on Reader Service Card

Gas Determinants

Bulletin WP-50 outlines standard procedure for study of gas streams in industrial flue systems, and of suspended matter (suspensoids) carried by these gases. Treatment of subject is thorough. 35 pages.—*Western Precipitation Corp., 405 Lexington Ave., New York 17.*

Circle L217C on Reader Service Card

Compressors

Booklet 1523 illustrates line of compressors designed to deliver oil-free air for agitation and processing of milk and milk products. Factors stressed in agitation process include no foaming, elimination of seasonal tastes, savings in power requirements. 8 pages.—*Ingersoll-Rand Co., 11 Broadway, New York 4.*

Circle L217D on Reader Service Card

Spray Nozzles

Claimed to be non-clogging, spray nozzles described in 4-page folder, No. 2386, may be used for cleaning all types of materials. Tables give dimensions of nozzles for 1-3 in. dia. lines and capacities in gpm. through orifices of 5/32 to ½ in. dia. at pressures of 20 to 100 psi.—*Link-Belt Co., 307 N. Michigan Ave., Chicago 1.*

Circle L217E on Reader Service Card

Plate Heat Exchanger

Directions on installing, operating, inspecting, cleaning, and lubricating plate units are given in 12-page *Maintenance Manual No. 3*. Explanatory photos and drawings are included.—*Cherry-Burrell Corp., 427 W. Randolph St., Chicago 6.*

Circle L217F on Reader Service Card

Regulating Valve

Cross-section drawing of pilot-operated regulating valve is one feature in Bulletin 700. Five designs are covered while illustrative panel shows how control function of regulator is changed by using different sensitive pilot. 4 pages.—*Spence Engineering Co., Inc., Walden, N. Y.*

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Purifier

Recently developed purifier is briefly outlined in Bulletin 400, a 2-page leaflet. Functions include: (1) Removing gunk and entrained solids from exhaust steam installations, (2) removing condensate from compressed air lines, (3) delivery of steam for food processing, (4) preventing contamination in gas and air lines, and (5) removing entrainment from vapor lines following evaporation.—*The V. D. Anderson Co., 1935 W. 96th St., Cleveland 2.*

Circle L217H on Reader Service Card

Heating Coils

Complete line of steam and hot water coils in standard and non-freeze types is described in new catalog, DS-385. Outlined are capacities, selection, performance, installation, and dimensional data. 68 pages.—*The Trane Co., La Crosse, Wis.*

Circle L217I on Reader Service Card

Control Equipment

Oxygen Determinant

New recording analyzer that measures oxygen directly without chemical reactions or secondary operations is described in 4-page pamphlet, No. 10.15-9. Manufacturer states it is designed for operations where precise determination of oxygen concentration is requirement.—*Minneapolis-Honeywell Regulator Co., Wayne and Windrim Aves., Philadelphia 44.*

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Electronic Controls

Brochure A-703 explains how electronics are utilized for automatically measuring and controlling process variables, such as tem-

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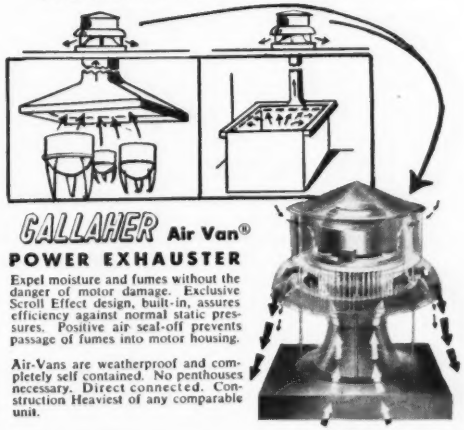

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perature, pressure, level, and flow by particular system. Release includes a system circuit diagram, along with typical application. 6 pages. — *Swartwout Co., 18511 Euclid Ave., Cleveland 12.*

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Sampling Monitor

Simplifying of quality control is purpose of new continuous sampling monitor reported on in 4-page bulletin, GEA-5738. Photos and diagrams explain unit's operation, construction, and range.—*General Electric Co., Schenectady 5, N. Y.*

Circle R218A on Reader Service Card

Infra-red Applicability

New instrument laboratory to help small companies evaluate applicability of infra-red methods to processes is described in *Instrument News*, Vol 3, No. 2. Additional information reports case histories of infra-red's use in product control. 8 pages.—*The Perkin-Elmer Corp., Norwalk, Conn.*

Circle R218B on Reader Service Card

Control Instruments

Catalog 5000 covers principal units in line of control instruments, measuring devices, and related components. Specifications of approximately 100 measuring and control instruments, also valves, are outlined, 28 pages.—*Minneapolis-Honeywell Regulator Co., Wayne and Windrim Aves., Philadelphia 44.*

Circle R218C on Reader Service Card

Resistance Thermometers

Entire line of general-purpose and specialized resistance thermometers used to detect temperatures between −325 and +1,000 deg. F. with accuracies from ±0.018 F. to ±3.0 F. are described and illustrated in 36-page catalog, *Thermohms, Assemblies, Parts and Accessories.*—*Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44.*

Circle R218D on Reader Service Card

Laboratory Science Booklet

Articles of technical interest as well as illustrated descriptions of new laboratory instruments, apparatus, and technics are found in *The Laboratory*, Vol. 21, No. 3. Publication, of 32 pages, tells of flame attachment for spectrophotometer, automatic steam generator for laboratory use, new chemical reagents, and other pertinent data.—*Fisher Scientific Co., 717 Forbes St., Pittsburgh 19.*

Circle R218E on Reader Service Card

Temperature Controllers

Operating characteristics, also installation notes on each of ten variations of basic thermostatic device, are given in new 52-page Catalog 400. Special section treats of operating differential, sensitivity, temperature variation, lag and overshoot, and heat sources, with units installed in solids, liquids, and gases. Profusely illustrated.—*Fenwal Inc., Ashland, Mass.*

Circle R218F on Reader Service Card

Materials Handling

Fork-Truck Case Study

Survey in one plant using four fork trucks records various advantages gained with units. 4-page pamphlet, No. 111.—*Towmotor Corp., 1226 E. 152nd St., Cleveland 10.*

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Electric Trucks

Four compact units designed for lifting, moving, and stacking heavy loads are presented in Bulletin 5143. Maneuverability in close quarters is emphasized. 12 pages.—*Barrett-Cravens Co., 4609 S. Western Blvd., Chicago 9.*

Circle R218H on Reader Service Card

Hardwood Pallets

Job-engineered and standard-type pallets are illustrated and suggested uses described in 16-page booklet. Also, load limits and other data are given.—*National Pallet Corp., Oliver Bldg., Pittsburgh.*

Circle R218I on Reader Service Card

Oscillating Conveyors

Catalog 2444 describes oscillating conveyors for conveying, feeding, cooling, and screening loose bulk materials. Included are dimensions, weights, capacity, and horsepower charts for heavy-duty as well as light-duty operations. 24 pages.—*Link-Belt Co., 307 N. Michigan Ave., Chicago 1.*

Circle R218J on Reader Service Card

Pallet-Loader Movie

Overall and close-up views of automatic pallet loader in operation are seen in 16 mm. sound movie now available. Running 15-min., film shows how unit assists in high-volume production of package goods, such as beverages, cooking oils, and other food products.—*J. S. McCullough, Lamson Corp., Syracuse, N. Y.*

Circle R218K on Reader Service Card

Canvas Belting

New treatments and technics for prolonging life and strength of stitched canvas conveyor and elevator belting are set forth in belting catalog. Given are details for ordering, installing, and maintaining eight types of belt, including those for handling hot materials. —*C. R. Daniels, Inc., Belting Div., 4900 Wetheredsville Rd., Baltimore 18.*

Circle R218L on Reader Service Card

Plant Supplies

Water Repellent

New silicone-base water repellent for application on exterior surfaces above grade masonry is described in 2-page news release.—*Ranetite Mfg. Co., Research Dept., 1917 S. Broadway, St. Louis 4.*

Circle L219A on Reader Service Card

Wire Straps and Stitches

Information on wire stitching technics is given in *Contab*, Vol 2, No. 3. Capsule articles tell how material may be used for shipping and for general materials handling purposes. 12 pages.—*Acme Steel Co., 2840 Archer Ave., Chicago 8.*

Circle L219B on Reader Service Card

Seals and Equipment

Attractive 32-page bulletin discusses vacuum seals and equipment. Colorful drawings explain sealing methods and point up construction features of closures. Food packaging is given emphasis.—*White Cap Co., 1819 N. Major Ave., Chicago 39.*

Circle L219C on Reader Service Card

Wire Rope Assemblies

Detailed description of operating functions of wire rope with fittings permanently attached are given in 19-page Bulletin 5201. Assemblies are used for operating controls, as part of machinery and equipment, and for slings and hoists.—*Macwhyte Co., Kenosha, Wis.*

Circle L219D on Reader Service Card

Lamps and Lighting

Bulletin, *The Why, When and How of Modern Lighting Maintenance* presents practical eight-step program covering burnouts, lighting levels, sanitation, lamp replacement, proper surroundings, line voltages, care of parts, and points on saving labor and equipment. 12 pages.—*Lighting Div., Sylvania Electric Products, Inc., 60 Salem St., Salem, Mass.*

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Odor-Banishing Fan

Reported to employ new air conditioning principle, fan is said to eliminate smoke, dampness, musty odors, and dead air pockets, yet not cause discomforting drafts. It is specified in leaflet as operating on three speeds with 115v., 60 cycle motor. Bulletin 217.—*Reynolds Electric Co., River Grove, Ill.*

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Lubricator

Automatic lubrication via self-feeding, pressure grease cup is subject of 4-page bulletin. Diagrams show parts and function of lubricator.—*A. L. Watson Co., 38 Crown St., Milton 87, Mass.*

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Miscellaneous

Gas Containers

Bulk storage of gas is subject of illustrated 4-page bulletin. Described are 100,000 cu.ft. containers, and others. Included are factors relating to construction, maintenance, and safety.—*General American Transportation Corp., 135 S. LaSalle St., Chicago 90.*

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Interfiling Punch

Bulletin P-14 explains in chart form how punched-card users can speed preparation of records and reports by mechanical device that compares, interfiles, segregates, and punches information on cards.—*Remington Rand Inc., 315 Fourth Ave., New York 10.*

Circle L219I on Reader Service Card

Executive Guide

Methods of materials control resulting in shorter production planning cycle and lowered production line delays is detailed in Catalog X-1268. Given are forms and procedure charts, plus procedures for engineering and data on production planning and progress, machine load, material and tool procurement and control. 56 pages.—*Remington Rand Inc., 315 Fourth Ave., New York 10.*

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Payroll System

Educational release, designated as No. 27, discusses payroll system of one company. Example is given of payroll preparation for 200 employees. All steps from writing of checks to final filing of records is reportedly completed in less than 2 hr. Folder of 6-pages.—*Ditto, Inc., Harrison at Oakley Blvd., Chicago.*

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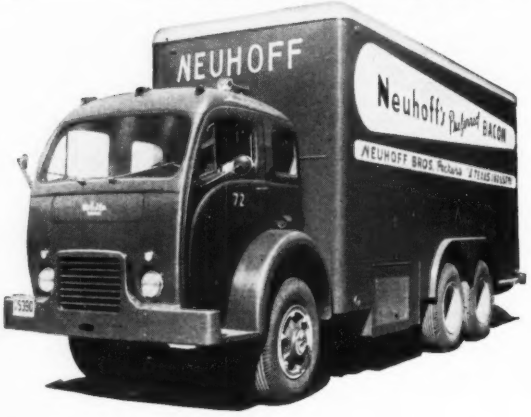

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makes foods

golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.
Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

SEND FOR BOOKLET

New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!

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WHERE TO STORE FROZEN FOODS

QUAKER CITY
COLD STORAGE CO., Inc.
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3 WAREHOUSE LOCATIONS
Proper Temperature for Frozen Foods

wanted:

MARGARINE—SHORTENING
PLANT FOREMAN

National food distributor has opening in Southwest for qualified man to supervise operations of margarine and shortening plant. Approximately 80 employees. Prefer graduate chemist or chemical engineer. Must have technical or supervisory experience in manufacture of edible fatty oil products. Should be qualified for membership in the American Oil Chemists' Society. Ability to supervise important. Permanent position, appropriate compensation, liberal executive benefits and excellent advancement opportunities. Reply in confidence, giving details on education, personal background, business experience and earnings. Our employees know of this opening.

Write to Food Engineering, Box P-3720,
330 W. 42nd St., New York 36, N. Y.

COURSES IN FOOD TECHNOLOGY

a. Mathematics and Chemistry of Food Technology
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MEN OR WOMEN
VETERANS OR NON-VETERANS
DAY AND NIGHT CLASSES

Highly qualified instructors with practical experience as well as European and American degrees in their respective fields.

ATTENTION EMPLOYERS

If you need qualified personnel, such as: Food Technologists, Laboratory Technicians, Mold Counters, Foremen, Foreladies, Graders and other trained personnel for Quality Control Work please contact the Employment Office of the school.

MIAMI SCHOOL FOR FOOD PROCESSING SPECIALISTS
Box 383 CORAL GABLES 34, FLORIDA
Telephone: 83-1301

POSITIONS WANTED
(Continued from preceding page)

FOOD TECHNOLOGIST: Experienced production supervision, product and processing research, wants position as plant superintendent, or related. 15 years experience canned and frozen foods; ice cream, fountain, and bakery supplies. Technical background: food technology and industrial engineering. Age 40, married, family. PW-3708, Food Engineering.

FOOD TECHNOLOGIST, Microbiologist-Sanitarian: B.A., U. of Calif. 1 yr. graduate studies. 3 yrs. experience in Antibiotics research and Food Fermentation industries. Desires position in Technical, Production and/or Supervisory capacity in Pacific Coast area. Veteran, age 30, married. PW-3779, Food Engineering.

PRODUCTION MANAGER for food plant. Thorough experience in management and administration, plant installation, sugar products development work. PW-3791, Food Engineering.

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IMPORTANT FRENCH Company specialist in food machinery and equipment manufacturing, with large possibilities in production and sales, would be interested by exclusive licenses of new machines or equipments in food industries for France and European countries. Address S.E.I.L.A. 16, rue Chauveau Lagarde-Paris (8) France.

SALESMAN COVERING Minnesota and Dakotas seeks product of merit to represent that area. P.O. Box 825, Minneapolis 1, Minn.

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Pre-Peeled Potatoes
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We are now manufacturing over $20,000,000 in various lines and wish to expand by acquisition of assets or stock of one of more industrial companies. In our negotiations the sellers' problems and wishes will receive full consideration. Present personnel will normally be retained.
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Tech'l Director—Ph.D. a leader with proven experience..... $12,000
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Busy food executives find that *at no cost to themselves* I can save them time and money in searching for that particular person they must have for their staff.
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TO EXPEDITE PRODUCTION

Food Processing Equipment including Aluminum and S/S Kettles, Mixers, Vacuum Pans, Dehydration equipment, Grinders, Elevators, Stills, Colloid Mills, Conveyors, Filters, Packaging Units, Wrapping Machines. Will consider a set up plant now operating or shut down. When offering give full particulars.

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WANTED

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330 W. 42nd St., New York 36, N. Y.

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Filler—Majonnier Model #90—Stainless—14 head $5000.00
Filler & Cartoner—Fred Goat—Satchel Bag 1100.00
Scale—Winter Coleman—Bulk type 85.00
Scale—Automatic Weighing Machine Co.... 55.00
Can Be Inspected in Philadelphia.
Offered As-Is, Where Is, Subject to Prior Sale.
R. D. Moore
AMERICAN STORES CO.
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FOR SALE

6—Pocket M & S #1 filler—will handle cans or jars up to 309—now set up for 211-304 or 8Z tall—new change parts for 202-309—bronze contact parts—can chute

6—Pocket M & S #2 filler—with new S.S. agit hopper—bronze valves and pockets—new S.S. main shaft—new screw feed for 16-oz. economy jars—will handle cans or jars up to #2—set up for #2 cans or 1-lb. economy jars—new change parts for 211-304 or 8Z tall cans

2—Instant & continuous Fondant Machines. Large stainless steel Syrup Hoppers—7½ HP. Motors.

Both machines have been completely rebuilt with new piston rings, new studs, new splash proof motors, direct drive, variable speed and new micromatic weight adjustments.

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1—J. H. Day Model D-8 800# Capacity Ribbon Mixer
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2—6500# Ribbon Mixers—11' Long—42" Wide—48" Deep Jacketed for 100# Working Pressure
Portable Agitators—1/3 Hp. ¼ Hp and ¾ Hp. S/S.
1—Peerless Dough Mixer—Double Arm—1½ Barrel Capacity Stainless Steel Steam Jacketed Kettles and Single Shell Tanks

AARON Equipment Company
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FOR SALE
100 qt. 6 speed Read Vertical Mixer
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Burns Peanut Roasters and Blanchers
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250 gallon Copper Steam Jacketed Kettle
SAVAGE BROS. CO.
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One (1) No. 429 Standard Knapp Conveyor Top and Bottom Shipping Case Gluer—Together with one (1) No. 606-61 Compression Unit—Complete—Ready To Use—Practically New.

ACCURATE MFG. CO., INC.
Garfield, N. J. Tel. Gregory 3-2900

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DRYERS

3—6'x50' Louisville Rotary Steam Tube Dryers.

1—4'x8' Flaker or Cooling Roll.

6—Atmos. Double Drum Dryers—1—B & C 28"x60"; 4—Buflovak 32"x90" & 32"x72"; 1—Amer. 42"x120".

MIXERS, Dry Powder

1—Howes 3000# double ribbon.

1—J. H. Day Size F, 1850#; Day size D10, 1250#; 1—Munson Rotary 1000# batch; 2—Broughton 700# & 1500#; 1—Day 200#, with sifter.

MIXERS, Miscellaneous

4—AMF Glen Mixers, 340, 160, 120 qt., S/S bowls & beaters.

4—B.P. 3000 gal. jacketed Mixers, size 30, type X-BS; 1—B.P. 1200 gal. unjack. Size 24, type X-BS.

1—BP 625 gal. Size 21 type X-BB; 3—350 gal.; 1—100 gal. Vacuum size 15 type VII-BB; 1—100 gal. size 15 type VI-BB; all jacketed.

1—BP 50 gal. size 14 type VI-BB; 1—BP 20 gal. monel lined, S/S blades. Size 12 type V-BS; all unjacketed.

1—Day size 300 Imperial unjacketed 75 gal., S/S lined S/S blades.

2—Reed 40 & 50 gal. double arm Mixers.

VACUUM PANS

1—Burkhard Jacketed 40 gal. Copper Vacuum Pan, 28" dia. x 28" deep.

1—All Copper 125 gal. Vacuum Pan, 30" dia. x 30" deep.

1—300 gal. Jacketed Copper Vacuum Pan, coils, 44" dia. x 36" deep.

4—Majonnier S/S Vacuum Pans, 3', 4', 5' and 6'.

EVAPORATORS

1—Zaremba Single Effect Evaporator, 54" dia. x 18', Black Steel body, copper tubes, 55ß sq. ft., with Elliot Barometric Condenser.

1—Swenson-Walker Triple Effect Evaporator, 1320 sq.ft. total. With copper tubes, steam pumps, condenser and piping.

PACKAGING MACHINES

2—Pneumatic Scale Packaging Lines, incl. Carton Feeder, former, liner, Weigher, Sealer, etc.

3—Transwrap Machines, Model A and Model B.

1—Standard Knap #429 Self-Adjusting Gluer-Sealer & Comp. Unit.

COLLOID MILLS

1—Charlotte ND-20 Horizontal Colloid Mill, Type #316 Stainless, 20 HP.

1—U. S. Horiz. Colloid Mill, 100-600 GPH, with 2—10 HP motors.

1—Eppenbach Vertical Size B Sanitary type S/S Colloid Mills, 3—30 GPH, Explosion proof motor.

1—U. S., Jr. Model Colloid Mill, 50-60 GPH, with 2—3 HP motors.

2—Premier Colloid Mills, Paste type, V-3-2109, Stellited Rotors, 7½ HP.

FILTERS

7—Filter Presses from 7"x7" to 42"x42", Cast Iron, Plate & Frame, Recessed, Open and Closed deliveries.

1—30"x30" Aluminum Filter Press, 45 Chambers.

1—24"x24" Aluminum Filter Press, 24 Chambers.

2—Sparkler Filters, 18D4 S/S & 18D12 Steel.

8—Oliver Vacuum Filters, incl. 8'x12', 11'6"x14', 11'6"x18'.

SCREENS & SIFTERS

1—"Selectro" 3'x8' Triple Deck, totally enclosed Vibrating Screen.

2—"Selectro" Single Deck Vibrating Screens, 3'x8' and 1½'x5'.

KETTLES

28—Aluminum Jacketed Kettles, from 50-500 gal., some agitated.

13—S/S Jacketed Kettles, from 30 to 300 gals., some agitated.

18—Copper Jacketed Kettles, from 25-600 gals.

8—Dopp C.I. jacketed 100, 150, 350 & 600 gal.; 3—150 gal. double motion agitated & jacketed.

LABELLING MACHINES

4—World & Ermold Semi Automatic; 2—World Rotary Automatic; 3—Burt Adjustable Wrap-Around; 6—N. J. Pony Labelrites.

TANKS

3—York 500 gal. Refrigeration Tanks, S/S lined, agitated.

5—9800 gal. Horiz. S/S Storage Tanks, Jacketed.

2—100 gal. S/S lined Vertical Tanks, on stands.

45—Aluminum Rectangular Storage Tanks, 800 gal., 650 gal. & 200 gal. capacities.

40—Misc. Steel Tanks, 500 gal.-15,000 gals.

MISCELLANEOUS

1—Buflovak 6' Vacuum Crystallizer.

1—5'x16' Mech Mfg. Co. Cooker or Dryer, Jacketed.

2—42" Amer. Tool & Machine Co. S/S Centrifugals, 40 HP motor.

1—Tolhurst 40" Monel Centrifugal.

66—Portable Agitators, all sizes & speeds.

3—Mikro Pulverizers, 2SI, 2TH, 4TH.

1—Capem SIF Capping Machine.

3—42"x72" Vertical Retorts, 3-basket.

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Why not tell us your requirements and then let us quote to your specific needs. No obligation, of course.

P.S. We are always interested in buying YOUR surplus equipment also.

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FOR SALE

8,000 and 10,000# cheese vats, stainless linings, both wood and metal shells.

Damrow type 2 agitators.

#72, 92, 192 DeLaval Separators, also Westphalia air-tight.

Presses 20' stainless.

Hoops—Romano, Muenster, Ricotto, Provolone, Salami, Cheddar, Twins, Daisy.

5# loaf.

Storage vats—60,000#, 40,000#, also uninsulated enclosed 10,000# stainless ideal for receiving or whey, also half round stainless for receiving or overhead whey storage.

Cheese trucks, skids and skid jacks; motor driven curd mills.

Straightaway Wright can washers 12 and 15 c.p.m.; Cherry and York.

20,000# super-plates, complete with holding tubes, flow diversion valves and air controls.

Wright 600-gal. stainless spray type pasteurizing vat, practically new.

Waukesha pumps, 1½" and 2", Sprinkman & Inalloy 20,000# milk filters.

In addition to the above, many other pieces of cheese factory and creamery equipment, all in good condition. We are anxious to sell—no reasonable offer rejected.

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2 Day Roball Sifters #71, 40" x 84", With Motors, S.S. Or Steel Screens & Rotex 20" x 48"
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New Ribbon Blenders, S.S. Or Steel, 8 to 100 Cu.Ft., Also Rebuilt Units Available

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All sizes in Stainless, Copper, Iron, Nickel, Alum.

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Vertical and Horizontal Pressure Vessels up to 15' long.

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2 S/S Atmospheric Drum Dryers 5'x10'
1 Double Drum Dryer; 28"x5'.
Proctor & Schwartz Apron Dryer 40'.

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Langsenkamp S/S Model B/EZ Adjust Pulpers with 7½ HP motors; others.
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Shriver and Sperri Plate & Frame Filter Presses up to 42"; wood or iron Filters by Niagara, Ertel, Alsop, etc.

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M. & S. 10 Pocket S/S Can or Jar Fillers. Mojonnier S/S 14 Head Vacuum Filler. Filler Mach. Co. and Elgin Piston Fillers. Juice Fillers by FMC, Horix, Berlin Chapman. Dry Powder Fillers by Stokes & Smith.

LABELLING EQUIPMENT

Wrap around Can and Jar Labellers by Standard Knapp, Burt, Kyler, Nu-Way etc. Spot Labellers semi and fully automatic.

DICERS — CUTTERS — CHOPPERS — SLICERS

Urschel Model B in S/S; Sterling EM-1D American Relish Cutters; Smith Silent Cutters; Boutell S/S Slicers; Peelers; Biro Stainless Steel Meat Saw, 1½ HP.

MISCELLANEOUS

Standard Knapp Casers or Boxers, Case Printers; Aut. Gluers and Sealers; Pasteurizers, Washers, Colloid Mills, Coolers, Exhausters, Centrifugals, and hundreds of other items. WHAT DO YOU NEED?

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157 Hudson Street,
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FOR SALE FROM STOCK

8—3000 gal. Horiz. Demountable Stainless Steel Truck Tanks, insulated & agitated, sanitary fittings, excellent for transporting, storing or holding milk, food products, wines, etc.
1—Illinois Water Treating System, 500 GPH flow-rate, complete with Zeolite tank.
4—Stainless Steel Steam Jacketed Kettles, with double motion agitators, 250 gal., and 150 gal.
70—Stainless Steel and Stainless Clad Jacketed Kettles, 10, 40, 60, 80, 100, 150, 500 gal.
35—Stainless Steel Tanks, 30, 50, 60, 100, 150, 200, 300, 400, 500, 900, 1000, 1400, 3000, 4200 and 5700 gal.
1—12 gal. Inconel Reaction Kettle, jktd, agit.; with condenser, etc.
5—Aluminum Tanks, closed, 500, 1350, 1485 gal.
6—Powder Mixers, 50#, 100#, 200#, 400#, 2000#, 2400#.
4—Selectro Stainless Steel Vibrating Screens, two-deck, 2'x7', enclosed.
10—Rotary Pellet Presses, Stokes B-2, D-3 & D-4; Kux model 25.
2—Triangles G-2-C Elec-Tri-Pak Weighers & Fillers.
2—Elgin Auto Twin Piston Fillers.
1—International 12 spout automatic Vacuum Filler, Stainless.
2—Mojonnier #90 Rotary Vacuum Fillers, 14-spout; stainless.
1—Feinc Rotary Vacuum Filter, string discharge, 4'6" dia. x 6', aluminum.
3—Sweetland Filters, #2, #5, & #12.
1—Alsop T316 Filter SD-12-NR-30.
10—Distillation Columns, aluminum, copper, steel.
1—Fitzpatrick "D" Comminuting Machine, Stainless Steel.

JUST PURCHASED
ONE-PIECE WELDED BREWERY TANKS

22—15,190 gal. Horiz. Lastiglas lined.
3— 5,859 gal. Horiz. Lastiglas lined.
2— 5,270 gal. Horiz. Lastiglas lined.
10— 7,000 gal. Vertical, closed, mammut lined.
2— 7,600 gal. Vertical, closed, mammut lined.

Excellent Condition

PERRY EQUIPMENT CORP.
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FOR SALE

3—32"x90" Buflovak Double Drum Dryers.
3000 gal. S.S. Truck Tanks, Trailerized.
100 gal. S.S. Clad Jkt. Kettles, 30"x52".
150 gal. S.S. Jkt. Kettle, 42"x34", agit.
100 to 250 gal. S.S. Mix Tanks, water jkt.
300 to 4000 gal. Glass Lined Tanks.
7 H.P. McKee Gas Fired Boiler.
15 H.P. Lookout Boiler, Coal Fired.
28" Centrifugal Extractors, 3 H.P.
Colloid Mills, 7½ and 15 H.P.
Gruendler Junior Pulverizer, 10 H.P.
75 to 1500 gal. Homogenizers or Viscolizers.
Model 148C Stokes High Vacuum Pump, 1½ H.P.
Hobart Grinder, 1½ H.P.
3 ft. to 6 ft. Copper Vacuum Pans.
2" Cherry-Burrell S.S. Pump, 5 H.P.
Milk Pasteurizers, Coolers, Fillers, Washers.

Send us your inquiries

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VALUES "BUY" BRILL

4—Pfaudler 100 gal. glass lined jacketed stills with glass lined condenser and glass lined receiver.
2—Oliver 8'x10' Monel Rotary Vacuum Filters.
1—Buflovak 32"x100" Double Drum Dryers.
1—Allbright-Nell 60"x80" Single Drum Flaker.
4—Acme and Groen 150, 125 gal. Stainless Steel Agitated Kettles.
2—10,000 gal. Stainless Steel Storage Tanks.
1—North Stainless Steel 1,000 lb. jacketed powder mixer 7½ HP motor.
5—38" Stainless Steel Revolving Pans.
2—Baker Perkins, Day 100 gal. Double Arm steam jacketed Mixers, sigma blades.
3—Stainless Steel and Aluminum Horizontal Storage Tanks 1500 and 1000 gal.
1—Model D Fitz Mill 7½HP.
9—Oliver Rotary Vacuum Filters 3'x4', 8'x8', 8'x12', 11'6"x14'.
1—Link Belt Roto-Louvre Dryer 11'6"x35'.
1—Link Belt Roto-Louvre Dryer 2'7"x8', monel.
1—Tolhurst 32" Suspended Centrifugal, Monel perforated basket, bottom discharge, m.d.
1—Fletcher 40" Suspended Centrifugal, stainless perforated basket, bottom discharge, m.d.
1—Tolhurst 48" center slung stainless steel Centrifugal.
1—#7 Sweetland Filter, 27 leaves, 3" c.c.
4—Shriver 30", 24", 18", 12" P&F Filters.
2—Sperry 30", 24" Aluminum P&F Filter Presses.
3—Louisville 6'x50', 6'x30' Steam Tube Dryers.
6—Sprout Waldron 40"x84" Single Deck S.S. Gyratory Sifters.
25—Stainless Kettles and Tanks, 20 to 500 gals.
12—Day, Rodgers Powder Mixers 200 to 3000 lbs.

Send for Complete Stock List

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ALWAYS YOUR OLD RELIABLE SOURCE

1—New Tolhurst 48" Stainless Steel Center Slung Centrifuge.
8—Stainless Steel Jacketed Kettles. Double Motion Agitators, 100 to 150 gals.
10—Stainless Steel Tanks 200 to 6000 Gals.
5—Fitzpatrick "D" Stainless Steel Comminutors, M.D.
2—Mikro Pulverizers #2TH Steel and 2FF—S.S. & Brze Const.
2—Day Jack. Mixers Double Arm 100 and 200 gals.
10—Horizontal Spiral Mixers to 2000# cap.
1—Shriver 30" C.I. Filter Press 36 Ch.
1—Shriver 42" C.I. Filter Press 26 Ch.
1—Urschel Model "J" Dicer, S.S.
4—Rotex Screens 36"x72" to 40"x120".
1—Stokes Rotary "DDS-2" Tablet Machine.
2—Stokes "B-2" Rotary Tablet Machines.
4—Stainless Steel 38" Revolving Pans.
1—Buflovak 6' Vac. Crystallizer.
2—Vac. Shelf Dryers—7 and 12 shelf.

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Rebuilt For New Machine Accuracy

At A Fraction Of The Original Cost

UNION Rebuilt Machinery — Established 1912

International Stainless Steel Straightline Vacuum Filler, with Automatic Feeder.
Resina LC Automatic Capper.
Capem E4F Rotary Capper.
Chisholm Ryder New Way Model MH Wraparound Labeler.
Stokes and Smith Transwrap Model B Bag Filler for Viscous and semi Viscous materials.
Baker Perkins BB, JNM and Readco Heavy Duty 50 to 150 gal. Double Arm Jacketed Mixers, Sigma or Fish Tail Blades.
Day and Robinson 100, 800, 1500, 2000 lbs. Dry Powder Mixers and Sifters.
J. H. Day 35 and 75 gal. Imperial Double Arm Steam Jacketed Mixers.
Day, Ross Pony Mixers; 8 and 15 gal. caps.
B. P. type 3500 gal. S. J. Double Arm Mixer.
Stokes, Day, New Era, Hottman Mixers 2 to 450 gals. with and without Jackets, Single and Double Arm Agitators.
Baker Perkins 200 gal. Unidor Steam Jacketed Double Arm Mixer.
Tri-Colloid 5½" S.S. Mill & Homogenizer.
Mikro 4TH, 3TH, 1SH Pulverizers; Jay Bee, Schutz O'Neill, Stedman Mills.
Allis Chalmers, Great Western Sifters.
Colton #2 and #3 Rotary Tablet Machines.
Pony ML Labelrites; Ermold, World Semi and Fully Auto. Rotary, Straightaway Labelers.
Burt automatic adj. Wraparound Labeler.
S. & S. G1, G2, G6 Auger Fillers.
F. J. Stokes HG88 Duplex Auger Filler.
Whiz Packer Fillers.
Triangle Package Models G2C, G25, N2CA Elec-Tri-Pak Fillers.
Horix and Elgin S.S. Rotary Fillers.
Filler 4 head S.S. Auto. Piston Filler.
Stokes, Colton Semi Auto. and Auto. Tube Fillers and Closers.
F. J. Stokes 90 D Auto. Tube Filler and Closer, also for jars.
Amsco and Doughboy Auto. Cellophane Bag Sealers.
Standard-Knapp No. 429 Carton Sealer.
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Sweetland, Alsop and Ertel Filters.
Huhn Steam and Gas-Fired Rotary Dryers.
Pneumatic Scale Auto. Tite-Wrapper.
Consolidated 13" Macaroni Presses.
Battery of Grimolas and Macaroni Mixers.
Clermont Auto. Noodle Cutter.
Clermont Reversible Dough Brake.

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UNION STANDARD EQUIPMENT CO.
318-322 Lafayette Street New York 12, N. Y.

TOP PRICES PAID FOR YOUR SURPLUS EQUIPMENT

—FOR SALE—

1—Sharples Stainless Steel Super D Canter, Model #PN-14.
1—Niagara #200 Filter, Stainless Steel leaves
1—Sparkler, Monel Jacketed Filter, Model #33C26
1—Sperry Heresite Filter Press, 36" x 36", Plate & Frame, 4 Eye, Closed Delivery
2—Downington Stainless Steel Heat Exchangers, 500 sq. ft. ea.
1—Day Jumbo Jacketed Powder Mixer, 6,000 lbs.
1—Readco Stainless Steel Jacketed Double Arm Mixer, 250 gals. cap., with Sigma Blades.
1—Stainless Steel Mixing Tank, 1000 gals. cap. with 10 HP Nettco drive.
1—1,500 gals. cap. Type 316 Stainless Steel Storage Tanks.

R. GELB & SONS, INC.
UNION, N.J.
Est. 1886 UNionville 2-4900

FOR SALE

Tanks: Pfaudler 3000 gal. glass lined vert. jktd.
Silent Cutter: Buffalo 70B, 800 lb.
Dryer: 36"x30" double roll atmospheric.
Powder Mixers: 100 to 2000 lb. capacities.
Liquid Fillers: Vacuum and Siphon types.
Screens: Rotex 40x90", Link Belt 24x96" liquid
Coloid Mill: Premier 3" st. steel, 7½ hp
Kettles: Stain. Steel, all sizes, new and used.
Filter Press: 24" Shriver 25 chambers.

Powder Fillers: Stokes & Smith, Stokes, Triangle
Mixers: Hobart M-80 4-speed 2 hp
Fillers: Geyer, Kiefer, Visco, M&S., Elgin.
Labelers: New Jersey, World, Knapp, Burt, Ermold.
Dough Mixers: Day, Read, Hobart, Champion.
Cappers: Capem. Pneu. Scale, Elgin, U.S.
Vacuum Pans: 6' stain. steel, 5' copper
Vacuum Pans: 300 gal. Pfaudler glass lined.

Send us a list of your idle equipment

LOEB EQUIPMENT SUPPLY CO.
1931 W. North Ave. Chicago 22, Ill.

BUY BEST in the WEST

A-B #10 Cooker-Cooler. 500-300 hld
Sprague #10 Cooker-Cooler. 580-290
M & S 6 piston #10 Filler. Bronze
American Utensil Model B Juice Extractors (2)
Urschel Model B Dicers (2)
Std Knapp B ox-46 ox Quick Adj Labelers
FMC High Pressure Tomato Line. 42" x 56'
A-B Double Deck 2½ Exhaust Boxes (2)
Yundt 8' x 30' Continuous Pasteurizer
Rotex #52 Double Deck Sifter. 5' x 10'
Eimco 8' x 8' Rot. Cont. Vacuum Filter
M & S 10 piston Filler. Stainless Steel
Reitz RD 18 S.S. Disint. 50 HP
FMC 8 oz-2½ Hand Pack Fillers. (3)
Burt 46 oz Caser. With Elevator
Majonnier 24 Pocket S. S. Filler
Buflovak 32" x 90" Double Roll Dryer
Ermold 6 Wide Automatic Labeler
Liquid O & J Automatic ½ gal. Labeler
Bird 36" x 50" S.S. Cont. Centrifugal
A T & M 30" Centrifugal. Solid Steel Basket
6' x 16' Stainless Vacuum Pan. Complete

Partial List Only — We Buy Your Surplus

MACHINERY AND EQUIPMENT CO.
514 BRYANT STREET SAN FRANCISCO 7, CALIF.

FOR SALE

APPROX. 250,000
12¼ OZ. CAP. GLASS JARS

Complete with 53 mm Anchorvac N style jar lids for these jars. All new merchdse, in excellent condition. Jars packed in 24-each cases. Priced for immed. sale at $3.60/gross, incl. caps, f.o.b. Allentown, Pa.

ALLEN PRODUCTS CO. Allentown, Pa.

MODERN PACKAGING EQUIPMENT

FOR IMMEDIATE DELIVERY

SPECIAL

PNEUMATIC SCALE CO. 60 Per Minute Fully Automatic Cartoning Line consisting of Automatic Feeder, Bottom Sealer, 4 Scale Net Weight Filler, Top Sealer, Compression Unit and Sheet Feed Tightwrap.

PNEUMATIC SCALE CO. 35 Per Minute Automatic Cartoning Line Automatic Feeder, Bottom Sealer, Liner, Filler, Top Sealer and Compression Unit.
J. L. FERGUSON PACKOMATIC HIGH SPEED (70 Per Minute) Cartoning Line consisting of Automatic Feeder, Top and Bottom Sealer, 18 Spout Volumetric Filler with rising and falling bed.
STOKES & SMITH Model B. Transwrap with Auger Fillers.
STOKES & SMITH Model HG84 Fully Automatic Auger Filler with vacuum attachment. Also Models G and GD Semi-Automatic.
PNEUMATIC SCALE CO. 10" Simplex Labeler.
PNEUMATIC SCALE CO. 4" Duplex Front and Back Labeler.
KARL KIEFER 24 Spout and 12 Spout Stainless Steel Rotary Vacuum Fillers.
CAPEM 4 Head Fully Automatic Capper.

WANTED

Single Machine or Entire Plants

ALLIED EQUIPMENT CO.
940-946 Nepperhan Ave., Yonkers 3, N. Y.
Phone: Yonkers 5-0442

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Whitehall 4-7900
CLEVELAND 15 ..... Thomas E. Taylor
1510 Hanna Bldg. ..... Superior 1-7000
DETROIT 26 ..... Thomas E. Taylor
856 Penobscot Bldg. ..... Woodward 2-1793
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7389 Oliver Bldg. ..... Atlantic 1-4707
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W. C. 2, Aldwych House, Aldwych

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FOR SALE

DAIRY EQUIPMENT

New and Almost New

1—Amesteam Generator 60 H.P.
1—Mojonnier Milk Tester Model—D
1—Moyno Rotary Food Pump & Motor 90 GPM
1—Shriver Diaphragm Pump 20 GPM
1—Morco Flowmaster Stainless Pump & Motor—6-24 GPM at 750 p.s.i.
1—Spencer Turbo Compressor & Motor 1150 CFM
1—Foster-Wheeled Steam Super Heater 3150# steam/hr. or 3000 cf./min. air at 100° superheat
2—G.E. Tinymotrol Motors with Electronic Speed Controls 5 & 2 H.P.
2—Crane 12" Wedge Type Valve 50 p.s.i. W.P.
1—500 gal. S.S. Totally enclosed Tank with Agitator & Motor

Detailed Specifications and Prices Available. All above equipment property of this dairy processor.

AVOSET CO.
P. O. Box 367
Gustine, California

---

1 M & S 10 Pocket Piston Type Filler for sizes from baby size food cans up to 1 pt. jars.

1 Food Machinery Cooling Tank for #10 cans.

1 Pfaudler 175 Gal. Capacity Stainless Steel Vacuum Pan with all necessary pumps, baffle tanks, etc.

2 650 Gallon Stainless Steel Cooking Tanks with both vertical and horizontal agitation.

Stuart Hale Company
2529 NORTH PULASKI ROAD
CHICAGO 39, ILLINOIS

Available Immediately

2-Lauenstein Chocolate Tempering Machines

and spare parts

In good operating condition. Details furnished quickly upon request.

M & M Ltd.
200 North 12th Street Newark 7, N. J.

FOR SALE

JAR CAPS

Approx. 280,000 53 M.M. Anchorvac N style, Plain enamel inside, Gold outside. BRAND NEW.
Price $7.50 per M f.o.b. Allentown, Pa.

ALLEN PRODUCTS CO.
ALLENTOWN, PA.

HOMOGENIZERS

2 200 gal. Manton Ganlin homogenizers—approx. 15 yrs. old in good working condition ..... $350.00 ea.

Other sizes in newer models also available.

ILLINOIS CREAMERY SUPPLY CO.
715 S. Damen Ave. Chicago 12, Ill.

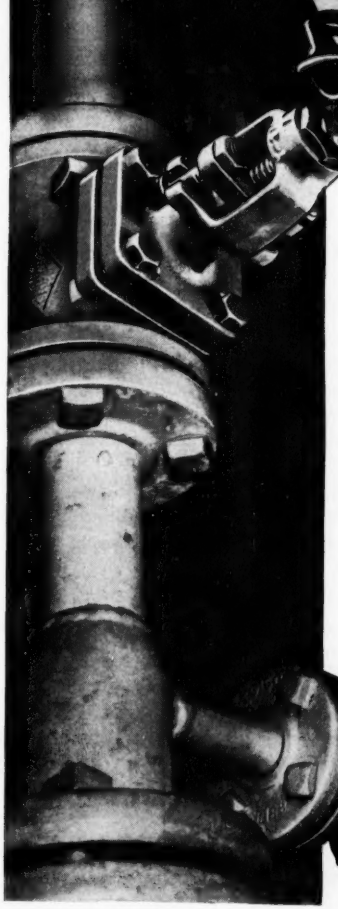
FOR SALE

1—Stainless Steam Jacket Kettle, 100 gal.
1—1000 lb. Day Mixer
4—Whiz Fillers
2—Doughboy Heat Sealers (One year old)

BETTAR ICE CREAM CO.
45 South Catherine St. Baltimore 23, Maryland

Here's the hookup
for valve-killing
corrosive services...

Stainless Steel
PLUS
Jenkins Quality



To end high valve mortality from corrosive liquids, and to control fluids that must be kept free from contamination or discoloration, stainless steel is the right metal. But it takes more than metal to make a valve. For dependable performance, you need the two-way hookup—Stainless Steel *and* Jenkins time-proved Valve Engineering.

With the increased demand for processing equipment that resists corrosion, more and more Stainless Steel Valves have been added to the Jenkins line. It now includes types and sizes to meet most industrial needs.

Look for the famous Diamond trade-mark on valves of stainless steel. As on *any* Jenkins Valve, it means extra years of trouble-free service.

Send for this folder, Form 194, describing the complete line of Jenkins Stainless Steel Valves. It contains specifications and other important data that will help you select the *right* valves for your plant. Jenkins Bros., 100 Park Ave., New York 17, Jenkins Bros., Ltd., Montreal.

JENKINS
LOOK FOR THE DIAMOND MARK
VALVES
SINCE 1864 TRADE JENKINS MARK

SOLD THROUGH LEADING INDUSTRIAL DISTRIBUTORS EVERYWHERE

2 OF THE BIGGEST REASONS WHY BAKERS SAVE WITH flo-Sweet LIQUID SUGAR!

1

flo-Sweet IS EASIER TO HANDLE!

Now that Flo-Sweet® has solved the problem of controlling the temperature of the batter, bakers can take advantage of the terrific savings in space, congestion and costly manpower that only liquid sugar can give. For years, bottlers and ice cream makers—whose sugar handling problem is far less complex and costly than the baker's—have saved with economical, easy-to-handle liquid sugar. It's ten times as important to you!—A Flo-Sweet liquid sugar installation delivers sugar to every mixing bowl at the turn of a tap . . . makes accurate measuring and mixing easy as pie—gives you 100% product perfection from every batch!

2

flo-Sweet IS TAILORED TO YOUR NEEDS!

Flo-Sweet provides the percent of invert you ask for at regular sucrose prices—saves important time and labor costs. No need to buy invert in drums. No messy invert mixing job. Thus, Flo-Sweet simplifies big plant usage of sugar in general and invert in particular . . . makes it possible for smaller plants to use invert on an economical basis. Just tell us how much invert you need and you'll get it ready-mixed in your Flo-Sweet *at no extra cost*, and absolutely free of the waste and mess of single-batch mixing!

NOTE: *If you want the savings, service, and product improvement enjoyed by the profit-minded bakers who use Flo-Sweet Liquid Sugar, write us for details today.*

flo-Sweet

Manufactured only by

REFINED SYRUPS & SUGARS, INC.

Yonkers 1, New York

PIONEERS IN LIQUID SUGAR FOR SAVINGS, SANITATION AND SERVICE

Reader Service

For food-plant employees and consultants only . . .

Use this **FREE INFORMATION** *service*

to obtain further details on equipment, supplies and processes described in editorial and advertising pages of this issue of FOOD ENGINEERING

HOW TO USE POSTCARD

Circle numbers of products you want to know more about; fill in your name, position and address; drop card in mail (no postage required). We tell companies what you want and they reply to you.

TO MAKE IT HANDY

Below is an alphabetical list of products and new literature described in advertisements and the following regular departments: New Equipment and Supplies; New Packages and Products; and Just Off the Press.

WHAT THE NUMBERS MEAN

The number after each item in the list is the number of the page it appears on. Where more than one item is described on a page, prefix capital letters indicate position: L,R,T,B,C (left, right, top, bottom, center). Small letters are used to separate several products described in an advertisement. Capital letters following page numbers identify products and literature described in monthly editorial departments.

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For Food Plant Employees and Consultants Only

Circle the numbers of the items—editorial or advertising—that interest you. Consult listings above and on following page for the correct number.

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CIRCLE NUMBERS HERE, FILL IN NAME AND ADDRESS, AND MAIL

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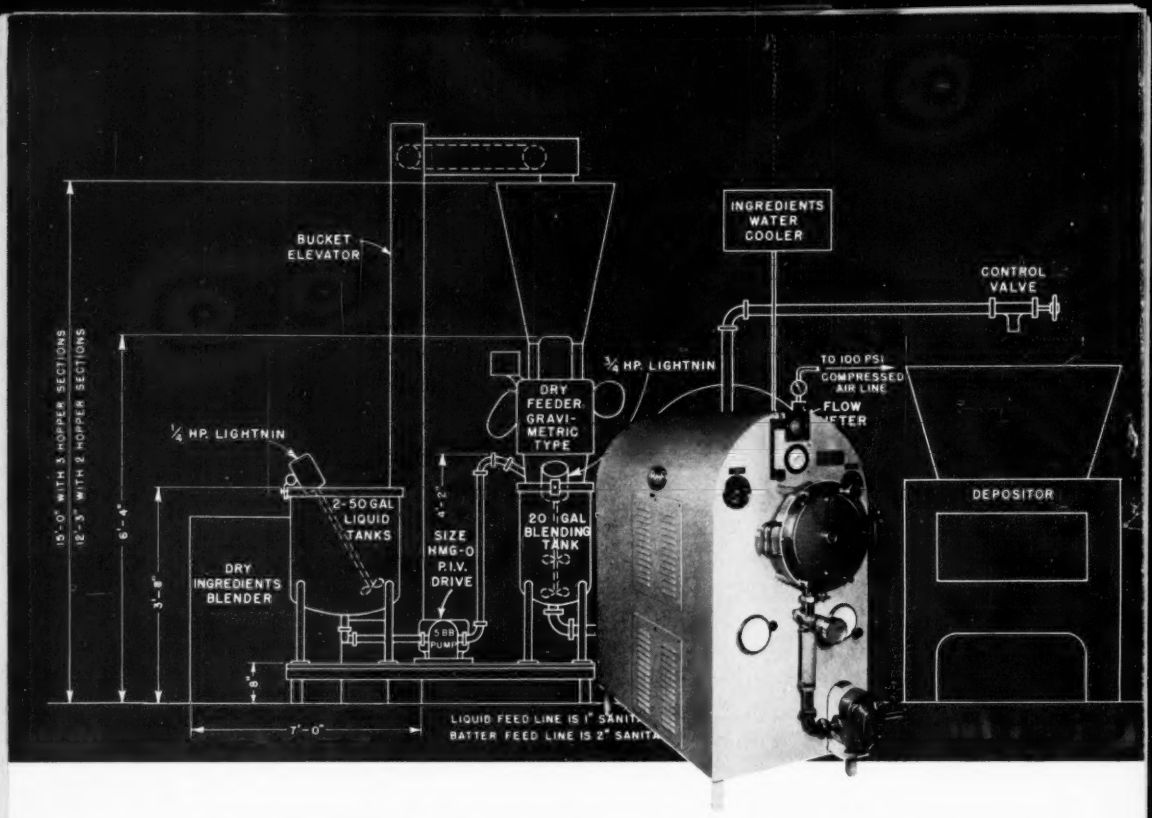

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